Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands & Waterways

BRP WPA Form 3 - Notice of Intent Instructions and Supporting Materials

Instructions for Completing Application WPA Form 3 – Notice of Intent

Please read these instructions for assistance in completing the Notice of Intent application form (WPA Form 3). These instructions cover certain items on the Notice of Intent form that are not self-explanatory.

Purpose of the Notice of Intent (NOI)

To protect the Commonwealth's wetland resources, the Massachusetts Wetlands Protection Act (General Law Chapter 131, Section 40) prohibits the removal, dredging, filling, or altering of wetlands without a permit. To obtain a permit (called an Order of Conditions), a project proponent must submit an application to the Conservation Commission and the Department of Environmental Protection (the Department). The Notice of Intent application provides the Conservation Commission and the Department with a complete and accurate description of the:

- **Site**: including the type and boundaries of resource areas under the Wetlands Protection Act, and
- **Proposed work**: including all measures and designs proposed to meet the performance standards described in the Wetlands Protection Act Regulations, 310 Code of Massachusetts Regulations (CMR) 10.00, for each applicable resource area.

The applicant is responsible for providing the information required for the review of this application to the permit issuing authority (Conservation Commission or the Department). The submittal of a complete and accurate description of the site and project will minimize requests for additional information by the issuing authority that may result in an unnecessary delay in the issuance of an Order of Conditions.

To complete this form, the applicant should refer to the wetlands regulations (310 CMR 10.00), which can be obtained from the Department's web site: http://www.mass.gov/dep/water/laws/regulati.htm. Regulations are available for viewing at public libraries and county law libraries across the state, as well as at the Department's Regional Service Centers (see http://www.mass.gov/dep/about/region/findyour.htm for locations of regional offices and the communities they serve). Regulations also are available for sale from the State House Bookstore in Boston (617-727-2834) and State House Bookstore West in Springfield (413-784-1378).

Requirements for Professional Services

The issuing authority may require that supporting plans and calculations be prepared and stamped by a registered professional engineer (PE) when, in its judgment, the complexity of the proposed work warrants this certification. Examples of information likely to require certification by a PE include: hydraulic and hydrologic calculations; critical elevations and inverts; and drawings for water control structures such as head walls, dams, and retention areas.

The issuing authority also may require that supporting materials be prepared by other professionals including, but not limited to, a registered architect, registered landscape architect, registered land surveyor, registered sanitarian, biologist, environmental scientist, geologist, or hydrologist when the complexity of the proposed work warrants specialized expertise.

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Completing WPA Form 3

Leave the shaded box located at the upper right hand corner of page 1 of NOI blank. This box contains the words: "MassDEP File Number" and "Document Transaction Number". The MassDEP File Number for this project will be issued to the Conservation Commission by the Department's regional office. Once issued, all subsequent correspondence on the project should reference the MassDEP file number.

Instructions to Section A: General Information

Item 1. Project Location. The map or plat, parcel, and lot numbers must be included if the lot subject to the NOI does not contain a residence, school, or commercial or industrial establishment, or if the lot is being subdivided.

Electronic filers must click on the button next to Item 1 and use to the GIS locator to identify the project site.

Item 3. Property Owner. If there is more than one property owner, a list of additional property owners should be attached to the Notice of Intent.

Item 5. Total Wetlands Protection Act Fee Paid. Instructions regarding calculations of fees are explained in Section F, below.

Item 6. General Project Description. The applicant should provide a brief description of the project. Describe, and show on accompanying maps and plans, both existing and proposed site conditions, including temporary construction impacts, replication areas, and/or other mitigation measures. Attach maps, plans, and other documents identifying proposed activities and their location relative to the boundaries of each wetland resource area and Buffer Zone (if applicable).

Item 8. Property Recorded at the Registry of Deeds. For Multiple Parcels, additional book and page numbers should be attached to the Notice of Intent.

Instructions to Section B: Buffer Zone and Resource Area Impacts

To determine the size and location of any impacts that a proposed project may have on each wetland resource area, first determine the resource area boundaries.

Item 1. Buffer Zone Only. The ***boundary of the buffer zone*** is determined by measuring 100 feet horizontally from the outer (landward) boundaries of bordering vegetated wetland, inland or coastal bank, coastal or barrier beach, rocky intertidal shore, salt marsh, and/or coastal dune. See Instructions in Section B, below, to determine the outer boundaries of these resource areas. If you check the Buffer Zone Only box in this section (indicating that the project is entirely in the Buffer Zone), skip the remainder of Section B of the Notice of Intent (Buffer Zone and Resource Area Impacts), and go directly to Section C of the Notice of Intent.

Item 2. The ***boundaries of inland resource areas*** in Items 2a through f can be determined by reference to the wetlands regulations, subsection (2), "Definitions, Critical Characteristics, and Boundaries," for each resource area covered under 310 CMR 10.54 - 10.58. The Riverfront Area, listed in Item1f, also can be a coastal resource area. The width of the Riverfront Area is described in 310 CMR 10.58(2)(a)3, and the methods for determining the Mean Annual High-Water Line (which is the inner boundary) are found in 310 CMR 10.58(2)(a)2 and 10.58(2)(c).

Item 3. The ***boundaries of coastal resource areas*** (in Items 3a-k can be determined by reference to 310 CMR 10.25 – 10.35, and to the definitions found in 310 CMR 10.04 and 10.23, and M.G.L. c. 131, § 40. Land Subject to Coastal Storm Flowage is defined in the Wetlands Protection Act (M.G.L. c. 131, § 40); there are no performance standards pertaining to this resource area.

Once you have identified the resource areas and located the components of the proposed project in each such area, you must indicate on the Notice of Intent the size of the proposed alterations (and proposed replacement areas) in each resource area. ***Replacement area standards***, if any, are included in the performance standards for each resource area, discussed in the paragraph below. See also the Department's *"Massachusetts Inland Wetland Replication Guidelines"*, March 2002 (available on MassDEP website at: http://www.mass.gov/dep/water/laws/policies.htm#wetlquid).

You must also attach to the Notice of Intent a narrative and any supporting documentation describing how the project will meet all ***performance standards*** for each of the resource areas altered, including standards requiring consideration of alternative project design or location. The wetland regulations describe the type and extent of work that may be permitted in resource areas, called performance standards. Proposed work must meet these standards.

- ***Performance standards for inland resource areas***, including the Riverfront Area (which can be either inland or coastal) are described in the Wetland regulations, subsection 3: "General Performance Standards" for each resource area covered under 310 CMR 10.54 - 58. Among other performance standards, an ***alternatives analysis*** **is** required for all projects involving bordering vegetated wetlands as well as those in the Riverfront Areas. Detailed requirements for the evaluation of alternatives to proposed work in Riverfront Areas and bordering vegetated wetlands are described at 310 CMR 10.58(4) and 310 CMR 10.55(4), respectively.

- ***Performance standards for coastal resource areas*** (excluding Riverfront Area) are described in various subsections within 310 CMR 10.25 – 10.35.

- ***Limited Projects*** are categories of activities specified in the regulations at 310 CMR 10.24(7) and 10.53(3) – (6), which can proceed at the discretion of the issuing authority without fully meeting the resource area performance standards. ***Performance standards for limited projects*** are described in the regulations at 310 CMR 10.24(7) and 10.53(3)-(6). An ***alternatives analysis*** performance standard is required for most limited projects.

Instructions to Section C. Other Applicable Standards and Requirements

Item 1. Rare Wetland Wildlife Habitat. Except for Designated Port Areas, no work (including work in the Buffer Zone) may be permitted in any resource area subject to the Act that would have adverse effects on the habitat of rare, "state-listed" vertebrate or invertebrate animal species.

The most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife is published by the Natural Heritage and Endangered Species Program (NHESP). See: http://www.mass.gov/dfwele/dfw/nhesp/nhregmap.htm or the *Massachusetts Natural Heritage Atlas.*

If any portion of the proposed project is located in Estimated Habitat of Rare Wildlife as indicated on NHESP maps, the project is subject to the endangered species protection provisions of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.37, 10.58(4)(b), & 10.59). Projects located within Estimated Habitat are also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18; for exemptions see 321 CMR 10.14). If any portion of the proposed project is located within Estimated Habitat, the applicant must send the Natural Heritage Program, at the following address, a copy of the Notice of Intent by certified mail or priority mail (or otherwise sent in a manner that guarantees delivery within two days), no later than the date of the filing of the Notice of Intent with the Conservation Commission and the Department.

Evidence of mailing to the Natural Heritage Program (such as Certified Mail Receipt or Certificate of Mailing for Priority Mail) must be submitted to the Conservation Commission and the Department's Regional Office along with the Notice of Intent.

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
Route 135, North Drive
Westborough, MA 01581
508.792.7270

To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete the portion of Section D in the NOI entitled: Streamlined Massachusetts Endangered Species Act/Wetlands protection Act Review. **If MESA supplemental information is not included with the NOI, the NHESP will require a separate MESA filing which may take up to 90 days to review.**

Item 2. Coastal Projects. The ***mean high water line*** in coastal areas is described in the regulatory definitions at 310 CMR 10.23. The definition of ***anadromous/catadromous "fish runs"*** is found at 310 CMR 10.35(2). If the proposed work is located in either such area, the applicant must send the Massachusetts Division of Marine Fisheries (South Shore (Cohasset to Rhode Island, and the Cape & Islands): Division of Marine Fisheries - Southeast Marine Fisheries Station, Attn: Environmental Reviewer, 838 South Rodney French Blvd., New Bedford, MA 02744 or North Shore (Hull to New Hampshire): Division of Marine Fisheries - North Shore Office, Attn: Environmental Reviewer, 30 Emerson Avenue, Gloucester, MA 01930) a copy of the Notice of Intent by certified mail or priority mail (or otherwise sent in a manner that guarantees delivery within two days) no later than the date of the filing of the Notice of Intent with the Conservation Commission and the Department. Evidence of mailing to the Division of Marine Fisheries (such as certified mail receipt or certificate of mailing for priority mail) must be submitted to the Conservation Commission and the Department's Regional Office along with the Notice of Intent.

Item 3. Areas of Critical Environmental Concern. If the project is proposed in one of the communities listed in the last page of these Instructions (also listed at the Department's web site: http://www.mass.gov/dep/water/approvals/wwforms.htm#appendix), the project may be located in an Area of Critical Environmental Concern (ACEC). To confirm whether the project location is in an ACEC, contact the Conservation Commission or the MA Department of Conservation & Recreation (formerly the Department of Environmental Management) ACEC Program at:

251 Causeway St., Suite 600
Boston, MA 02114
617.626.1394

The ACEC Program also may be contacted for additional information or to verify new ACEC designations.

Item 5. Restriction Orders. If any portion of the proposed project is located on a site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131 § 40A) or Coastal Wetlands Restriction Act (M.G.L. c. 130 § 105), attach a copy of the order to the Notice of Intent. To determine if a Wetlands Restriction Order exists for the site, contact the Conservation Commission or the Department's Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

Item 6. Stormwater Management. According to MassDEP's Stormwater Regulations (January 2008), certain projects require stormwater management measures. To determine if a project requires stormwater management, consult the Wetland Regulations at 310 CMR 10.05(6) and the Department publications: *Massachusetts Stormwater Management Handbook: Volumes 1, 2, 3.* These documents are available for purchase from the

State House Bookstore (617/727-2834) and State House Bookstore West (413/784-1378) and also may be obtained from MassDEP's web site: http://www.mass.gov/dep/water/laws/policies.htm#storm.

If stormwater management is required, applicants are required to submit a Stormwater Report with the Notice of Intent to provide stormwater management information for Conservation Commission review consistent with the wetland regulations, 310 CMR 10.05(6)(k)-(q). The Department requires engineers to also complete the Stormwater Report Checklist and Certification to certify that the project conforms to the Stormwater Regulations and meets acceptable engineering standards. For recharge wells, check the Underground Injection Control (UIC) requirements to see if UIC regulation is required at http://www.mass.gov/dep/water/approvals/dwsforms.htm#uic.

Instructions to Section D: Additional Information

All information listed in Section D of the Notice of Intent must be provided along with the Notice of Intent when it is filed with the conservation commission and the Department.

Item 2. Plans should be of adequate size, scale, and detail to completely and accurately describe the site, resource area boundaries, and proposed work. The following guidelines are provided to encourage uniformity:

Sheet Size
- Maximum 24" x 36"
- If more than one sheet is required to describe the proposed work, provide an additional sheet indexing all other sheets and showing a general composite of all work proposed within the Buffer Zone and areas subject to protection under the Act.

Scale
- Not more than 1" = 50'
- If plans are reduced, display graphical scales.

Title Block
- Included on all plans
- Located at the lower right hand corner, oriented to be read from the bottom when bound at the left margin
- Include original date plus additional space to reference the title and dates of revised plans.

Item 3. Resource Area Delineation Methodology: Attach documentation of the methodology used to delineate the Bordering Vegetated Wetlands (BVW) boundary (e.g. BVW Field Data Form, Final Order of Resource Area Delineation or other delineation method) as well as methods used to delineate any other resource areas proposed for alteration.

Instructions to Section E: Fees

A wetland application filing fee must accompany the Notice of Intent. The fee is based on the category of the proposed activity (described in 310 CMR 10.03(7)) and the resource area to be impacted by the activity. To calculate the filing fee of the NOI Wetland Fee Transmittal Form from the instructions below.

In summary, the total filing fee for a Notice of Intent that involves more than one activity is determined by adding the fees for each proposed activity. When work is proposed in the Riverfront Area, as well as another resource area or their Buffer Zones, add 50% to the fee for each activity in the Riverfront Area. For activities exclusively within the Riverfront Area, and not within other resource areas or their Buffer Zones, the fee is determined by

adding the amounts for each proposed activity. The city/town share of the fee is the first $25, plus half of the remaining total fee. The state share is half the total fee in excess of $25.

Complete pages 1 and 2 of the NOI Wetland Fee Transmittal Form (attached to the NOI) and send them, along with a check for the state share of the filing fee, payable to *the Commonwealth of Massachusetts*, to MassDEP, Box 4062, Boston, MA 02211. Review of the Notice of Intent cannot begin until the fee is received.

Include check number and payor name information on the Notice of Intent to expedite fee payment confirmation.

No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

In addition, a notice of the application must be placed in a local newspaper, and published at least five days prior to the hearing, at the applicant's expense. Contact the Conservation Commission for the municipality where the project is located regarding the procedure for public newspaper notice.

Instructions for Completing the NOI Wetland Fee Transmittal Form

The wetland filing fee should be calculated using the following steps based on a hypothetical project involving two driveway crossings through a Riverfront Area and Bordering Vegetated Wetland and six single family houses in Riverfront Area only.

Step 1/Type of Activity: Review plans and narrative to identify each activity in wetland resource areas and their applicable Buffer Zones. Example: driveway crossing and construction of a single family house.

Step 2/Number of Activities: Determine the number of each activity associated with the project. Example: driveway crossings and 6 single family homes.

Step 3/Individual Activity Fee: List the fee amount for each category of activity (see Category Activities and Fee, below) Example: Driveway crossing is a Category 2(f.) activity and is $500 each. Construction of a single family house is a Category 2(a.) activity and is $500 each.

Step 4/Subtotal Activity Fee: Determine the subtotal fee for each type of activity by multiplying the fee for the activity (Step 3) by the number of activities (Step 2). If the activity is within the Riverfront Area as well as another resource area or its Buffer Zone, add 50% to total fee (e.g., multiply the fee by 1.5). If the activity is located in a Riverfront Area only, apply the fee amount for the category without the additional 50%. Example: 2 (driveway crossings in BVW) x $500 x 1.5 (for riverfront area) = $1,500; 6 (single family homes) x $500 = $3,000.

Step 5/Total Project Fee: Add all the subtotals identified in Step 4 to determine the total fee. Example: $1,500 + $3,000 = $4,500.

Step 6/Fee Payments: The state share of the fee is 50% of any filing fee in excess of $25 (i.e., the state share can be determined by dividing the total fee in half and subtracting $12.50); the remaining portion of the fee shall be made to the city or town (i.e., the City/Town share can be determined by dividing the total fee in half and adding $12.50). Example: City/Town share: $2,262.50; state share: $2,237.50.

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Category Activities and Fees

Category 1 (Fee for each activity is **$110**):
- a.) work on single family lot; addition, pool, etc.;
- b.) site work without a house;
- c.) control vegetation;
- d.) resource improvement;
- e.) work on septic system separate from house;
- f.) monitoring well activities minus roadway;
- g.) new agricultural or aquaculture projects.

Category 2 (Fee for each activity is **$500**)
- a.) construction of single family house;
- b.) parking lot;
- c.) beach nourishment;
- d.) electric generating facility activities;
- e.) inland limited projects minus road crossings and agriculture;
- f.) each crossing for driveway to single family house;
- g.) each project source (storm drain) discharge;
- h.) control vegetation in development;
- i.) water level variations;
- j.) any other activity not in Category 1, 3, 4, 5 or 6;
- k.) water supply exploration.

Category 3 (Fee for each activity is **$1,050**)
- a.) site preparation (for development) beyond Notice of Intent scope;
- b.) each building (for development) including site;
- c.) road construction not crossing or driveway;
- d.) hazardous cleanup;
- e.) water supply development.

Category 4 (Fee for each activity is **$1,450**):
- a.) each crossing for development or commercial road;
- b.) dam, sluiceway, tidegate (safety) work;
- c.) landfills operation/closures;
- d.) sand and gravel operations;
- e.) railroad line construction;
- f.) bridge;
- g.) hazardous waste alterations to resource areas;
- h.) dredging;
- i.) package treatment plant and discharge;
- j.) airport tree clearing;
- k.) oil and/or hazardous material release response actions.

Category 5 (Fee is **$4 per linear foot**; total fee not less than $100 or more than $2,000):
- a.) work on docks, piers, revetments, dikes, etc. (coastal or inland).

Category 6 (Fee is **$2 per linear foot for each resource area): For each resource area delineation, the fee shall not** exceed $200 for activities associated with a single family house or $2,000 for all other activities).

Instructions to Section F: Signatures and Submittal Requirements

Signatures and Submittal Requirements. Follow the filing instructions in Section F of the Notice of Intent. For additional filing requirements, see Section D of these instructions, above. The original Notice of Intent and a copy must be sent, by certified mail or hand delivery, to the Conservation Commission. At the same time the original Notice of Intent is submitted to the commission, one copy of the Notice of Intent must be sent to the appropriate MassDEP Regional Office (see MassDEP regional addresses on the last page of these instructions) by certified mail or hand delivery. Failure by the applicant to send the copies in a timely manner may result in dismissal of the Notice of Intent application.

Mail transmittal forms and MassDEP payments, payable to:

Commonwealth of Massachusetts
Department of Environmental Protection
Box 4062
Boston, MA 02211

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands & Waterways

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TOWNS WITH ACECs WITHIN THEIR BOUNDARIES

Town	ACEC NAME
Ashby	Squannassit
Ayer	Petapawag and Squannassit
Barnstable	Sandy Neck/Barnstable Harbor
Bolton	Central Nashua River Valley
Boston	Rumney Marshes
	Fowl Meadow and Ponkapoag Bog
Neponset	River Estuary
Bourne	Pocasset River
Herring	River Watershed
Bourne	Back River
Braintree	Cranberry Brook Watershed
Brewster	Pleasant Bay, Inner Cape Cod Bay
Bridgewater Hockomock	Swamp
Canton	Fowl Meadow and Ponkapoag Bog
Chatham Pleasant	Bay
Cohasset	Weir River
Dalton	Hinsdale Flats Watershed
Dedham	Fowl Meadow and Ponkapoag Bog
Dunstable Petapaw	ag
Eastham	Inner Cape Cod Bay
Wellfleet	Harbor
Easton	Canoe River Aquifer
Hockomock	Swamp
Egremont	Karner Brook Watershed
Essex	Parker River/Essex Bay
Falmouth W	aquoit Bay
Foxborough	Canoe River Aquifer
Gloucester	Parker River/Essex Bay
Groton	Petapawag and Squannassit
Grafton	Miscoe-Warren-Whitehall Watersheds
Harvard	Central Nashua River Valley
Squannassit	
Harwich	Pleasant Bay
Hingham	Weir River, Weymouth Back River
Hinsdale	Hinsdale Flats Watershed
Holbrook	Cranberry Brook Watershed
Hopkinton	Westborough Cedar Swamp
Miscoe-W	arren-Whitehall Watersheds
Hull	Weir River
Ipswich	Parker River/Essex Bay
Lancaster	Central Nashua River Valley
Squannassit	
Lee	Kampoosa Bog Drainage Basin
Leominster	Central Nashua River Valley

Town	ACEC NAME
Lunenburg Squannassit	
Lynn	Rumney Marshes
Mansfield	Canoe River Aquifer
Mashpee W	aquoit Bay
Melrose	Golden Hills
Milton	Fowl Meadow and Ponkapoag Bog
Neponset	River Estuary
Mt Washington	Karner Brook Watershed,
Schenob	Brook
Newbury	Parker River/Essex Bay
Norton	Hockomock Swamp
Canoe	River Aquifer
Norwood	Fowl Meadow and Ponkapoag Bog
Orleans	Inner Cape Cod Bay, Pleasant Bay
Pepperell P	etapawag and Squannassit
Peru	Hinsdale Flats Watershed
Plymouth	Herring River Watershed,
Ellisville	Harbor
Quincy	Neponset River Estuary
Randolph	Fowl Meadow and Ponkapoag Bog
Raynham Hockomock	Swamp
Revere	Rumney Marshes
Rowley	Parker River/Essex Bay
Sandwich	Sandy Neck/Barnstable Harbor
Saugus	Rumney Marshes, Golden Hills
Sharon	Canoe River Aquifer
	Fowl Meadow and Ponkapoag Bog
Sheffield	Schenob Brook
Shirley	Squannassit
Stockbridge	Kampoosa Bog Drainage Basin
Taunton	Hockomock Swamp, Canoe River Aquifer
Townsend	Squannassit
Truro	Wellfleet Harbor
Tyngsborough Petapaw	ag
Upton	Miscoe-Warren-Whitehall Watersheds
Wakefield Golden	Hills
Washington	Hinsdale Flats Watershed
Wellfleet	Wellfleet Harbor
W Bridgewater	Hockomock Swamp
Westborough	Westborough Cedar Swamp
Westwood	Fowl Meadow and Ponkapoag Bog
Weymouth	Weymouth Back River
Winthrop	Rumney Marshes

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

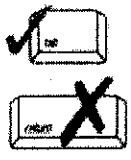
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

off Monsen Rd-19X Peter Spring (a. Street Address) | Concord (b. City/Town) | 01742 (c. Zip Code)

Latitude and Longitude: 42 28 38.860N (d. Latitude) | 71 19 56.168W (e. Longitude)

106 (f. Assessors Map/Plat Number) | 1194 (g. Parcel /Lot Number)

2. Applicant:

Elizabeth (a. First Name) | Herland (b. Last Name)

US Fish and Wildlife Service, Great Meadows NWR (c. Organization)

73 Weir Hill Road (d. Street Address)

Sudbury (e. City/Town) | MA (f. State) | 01776 (g. Zip Code)

978.443.4661 (h. Phone Number) | 978.443.2898 (i. Fax Number) | Libby_Herland@fws.gov (j. Email Address)

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name | b. Last Name

c. Organization

d. Street Address

e. City/Town | f. State | g. Zip Code

h. Phone Number | i. Fax Number | j. Email address

4. Representative (if any):

a. First Name | b. Last Name

c. Company

d. Street Address

e. City/Town | f. State | g. Zip Code

h. Phone Number | i. Fax Number | j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$165 (a. Total Fee Paid) | $70 (b. State Fee Paid) | $95 (c. City/Town Fee Paid)

A. General Information (continued)

6. General Project Description:
We propose cleaning drainage ditches and creating deeper water holding pools at the Concord Impoundments, Great Meadows NWR.

7a. Project Type Checklist:

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Limited Project Driveway Crossing
4. ☐ Commercial/Industrial
5. ☐ Dock/Pier
6. ☐ Utilities
7. ☐ Coastal Engineering Structure
8. ☐ Agriculture (e.g., cranberries, forestry)
9. ☐ Transportation
10. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No If yes, describe which limited project applies to this project:
10.53 3i
2. Limited Project

8. Property recorded at the Registry of Deeds for:
Middlesex
a. County
b. Certificate # (if registered land)
6826
276
c. Book
d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☒ Bordering Land Subject to Flooding	8712000 (200 acres) (1. square feet)	flood annually (2. square feet)
	no significant loss (3. cubic feet of flood storage lost)	expected (4. cubic feet replaced)
e. ☐ Isolated Land Subject to Flooding	(1. square feet)	
	(2. cubic feet of flood storage lost)	(3. cubic feet replaced)
f. ☒ Riverfront Area	(1. Name of Waterway (if available))	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 1026000 square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.
1400	700	700

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	(1. square feet)	
	(2. cubic yards dredged)	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	(1. square feet)	(2. cubic yards beach nourishment)
e. ☐ Coastal Dunes	(1. square feet)	(2. cubic yards dune nourishment)

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shore s	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW | b. square feet of Salt Marsh

C. Other Applicable Standards and Requirements

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://www.mass.gov/dfwele/dfw/nhesp/nhregmap.htm.

a. ☒ Yes ☐ No **If yes, include proof of mailing or hand delivery of NOI to:**

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
Route 135, North Drive
stborough, MA 01581

2006
b. Date of map **We**

If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.C, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.1.d, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

C. Other Applicable Standards and Requirements (cont'd)

1. c. Submit Supplemental Information for Endangered Species Review *

1. ☒ Percentage/acreage of property to be altered:

(a) within wetland Resource Area — 100% (percentage/acreage)

(b) outside Resource Area — (percentage/acreage)

2. ☐ Assessor's Map or right-of-way plan of site

3. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) ☒ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☒ Photographs representative of the site: aerial photos/maps included

(c) ☐ MESA filing fee (fee information available at: http://www.mass.gov/dfwele/dfw/nhesp/nhenvmesa.htm) US Govt, exempt from fees
Make check payable to "Natural Heritage & Endangered Species Fund" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☒ Vegetation cover type map of site: map not available; vegetation listed in project description.

(e) ☒ Project plans showing Priority & Estimated Habitat boundaries

d. OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/nhenvexemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing.

a. NHESP Tracking Number — b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see www.nhesp.org regulatory review tab). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

C. Other Applicable Standards and Requirements (cont'd)

2. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

   a. ☐ Not applicable – project is in inland resource area only

   b. ☐ Yes ☐ No If yes, include proof of mailing or hand delivery of NOI to either:

   South Shore - Cohasset to Rhode Island, and the Cape & Islands:

   Division of Marine Fisheries - Southeast Marine Fisheries Station
   Attn: Environmental Reviewer
   838 South Rodney French Blvd.
   New Bedford, MA 02744

   North Shore - Hull to New Hampshire:

   Division of Marine Fisheries - North Shore Office
   Attn: Environmental Reviewer
   30 Emerson Avenue
   Gloucester, MA 01930

   Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐Yes ☒ No

5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐Yes ☒ No

6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☐ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwate r Management Handbook Vol. 2, Chapter 3)

      2. ☐ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☒ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. [X] USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. [X] Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

3. [X] Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. [ ] List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title

b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5. [ ] If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. [X] Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. [ ] Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. [X] Attach NOI Wetland Fee Transmittal Form

9. [ ] Attach Stormwater Report, if needed.

E. Fees

1. [ ] Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority. Federal Government, exempt

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

645 2. Municipal Check Number	29 May 2009 3. Check date
644 4. State Check Number	29 May 2009 5. Check date
Elizabeth 6. Payor name on check: First Name	Herland 7. Payor name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant

2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

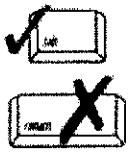
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Applicant Information

1. Applica nt:

Elizabeth — a. First Name
Herland — b. Last Name
US Fish and Wildlife Service, Great Meadows NWR — c. Organization
73 Weir Hill Road — d. Mailing Address
Sudbury — e. City/Town
MA — f. State
01776 — g. Zip Code
978-443-4661 — h. Phone Number
978-443-2898 — i. Fax Number
Libby_Herland@fws.gov — j. Email Address

2. Property Owner (if different):

a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email Address

3. Proje ct Location:

off Monsen Rd @ 19X Peter Spring Rd — a. Street Address
Concord — b. City/Town

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

B. Fees

The fee should be calculated using the following six-step process and worksheet. **Please see Instructions before filling out worksheet.**

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
ditch work, pool refugia	1	$110 + $55 (riverfront)	
			$165

Step 5/Total Project Fee: **$165**

Step 6/Fee Payments:

Total Project Fee:	$165 — a. Total Fee from Step 5
State share of filing Fee:	$ 70 — b. 1/2 Total Fee **less** $12.50
City/Town share of filling Fee:	$ 95 — c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

U.S. Fish and Wildlife Service
Great Meadows National Wildlife Refuge
Concord Impoundments

Proposal to Maintain Ditches and Create Freshwater Refugia

Introduction:

Great Meadows National Wildlife Refuge (Refuge) is part of the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The Refuge was established in 1944, "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds", 16 U.S.C.§ 715d (Migratory Bird Conservation Act); and for purposes, "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species...",16 U.S.C. § 460k-1 (Refuge Recreation Act). The Concord Unit of Great Meadows Refuge includes two, 100-acre impoundments located adjacent to the Concord River off Monsen Road, referred to as the Concord Impoundments.

The primary objectives included in this project proposal are to: (1) perform maintenance cleaning of the drainage ditches in the two Concord Impoundments, (2) clean an existing refugia which will hold water during impoundment drawdowns and (3) create a total of four new (two within each impoundment) "refugia" to provide additional flooded habitat during drawdowns.

We are requesting a 5-year permit to successfully meet these objectives. The USFWS previously submitted a proposal for these objectives in July 2008 but the project proposal was withdrawn in early September 2008 following concerns expressed by the Massachusetts Natural Heritage and Endangered Species Program and the Concord Conservation Commission. Some concerns extend beyond the details of short-term work necessary to meet these objectives, to long-term management priorities and water level management. Therefore, we have included information in this proposal which addresses short- and long-term management concerns. Further, in response to inquiries, we've included (Appendix A) a summary of the process used by each national wildlife refuge when determining priority resources of concern.

Background of Management Capabilities:

Each of the two impoundments has one water control structure on the "back dike" that connects to the Concord River (Figure 1). There is also a water control structure on the cross dike that connects the two impoundments to each other. Each of the three water control structures consists of a cement culvert under the dike, with stop log structures located on either end of the culvert. There are two rows of stop logs on each side of the culvert. The stop logs may be removed to draw down water levels, and replaced to maintain or increase water levels.

The top of the cement headwall of the lower water control structure is set at 113.39 feet above see level (a reading of 5.68 on our water gauge). The bottom of the cement structure is at 107.71 feet. The top of the cement headwall for the upper water control structure is at 114.08 feet above

mean sea level (a reading of 5.63 on the water gauge). The bottom of the cement structure is at 108.45 feet.

The upper impoundment (upstream) is drained by removing stop logs from the water control structure connected to the Concord River and the water control structure at the cross dike between the two impoundments. The lower impoundment (downstream) is drained by removing the stop logs at the water control structure connected to the Concord River. At high water stages within the Concord River, water can be allowed to flow into each impoundment through its "back dike" water control structure. At extremely high river stages, water flows uncontrolled over the top of the back dike into the impoundments. This occurs almost every year in the spring.

Since acquiring this property in 1944, the impoundments were managed primarily as full level pools until the late 1990s. This management strategy dramatically minimized wetland dynamics, and subsequently reduced floral and faunal diversity to those species that are able to endure nearly constant water levels. Floral diversity in the impoundments was limited to cattail, water chestnut, arrow arum, purple loosestrife, American lotus, and other species that can tolerate standing water. Some sedges and rushes were present in the impoundments, but their density was quite low in most years.

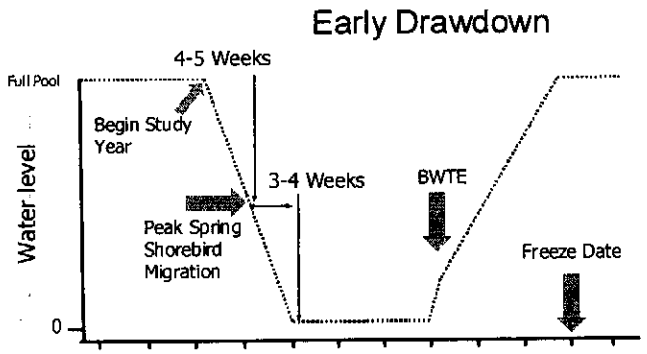
Description of Water Level Management Since 2000:

Since 2000, Refuge staff have been actively manipulating water levels in the two impoundments to provide habitat primarily for migratory birds. In most years, management has been conducted in conjunction with dozens of other Refuges located in the northeast (Maine to Virginia) and the midwest (Ohio to Minnesota) through the course of two different multi-year studies.

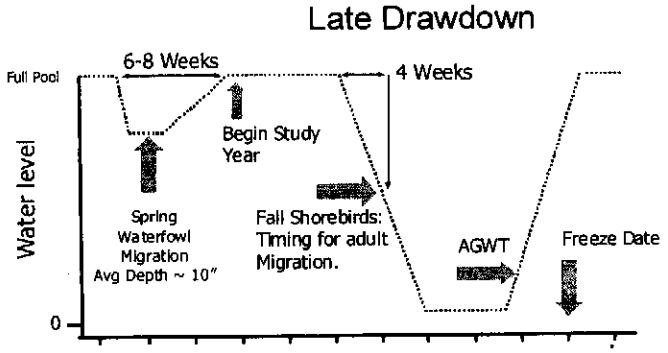
1. The first study was conducted from 2000-2002 and was designed to evaluate if water level management for spring migrating shorebirds (drawdowns to expose mudflats) could be conducted in concert with management for fall migrating waterfowl, or if management for one suite of species would preclude management for the other suite of species. During this study, two different methods of drawdowns were randomly assigned and used at the impoundments (when weather cooperated): a fast drawdown wherein many stop logs are removed at one time to rapidly drain large portions of an impoundment as quickly as possible; or, a slow drawdown wherein a fewer number of stop logs are removed. When this study ceased in 2002, Refuge staff continued water level management and annual drawdowns, but it was less structured than during the years of the study.

2. The second study was conducted from 2005-2008 and was designed to evaluate if impoundment management could provide habitat for spring and fall migrating shorebirds and waterfowl. Thus, it had a broader scope than the first study. During this study, two different methods of drawdowns were randomly assigned and used at the impoundments. Timing of drawdown, rather than speed, distinguished the two different management regimes. The targeted water level management schemes are shown in the diagrams

below, but the actual management capability (timing and quickness of drawdowns) was often hampered by spring and summer floods due to heavy rains.



Date	Description
Mid – Late Apr	Start gradual drawdown to continuously expose new mudflats for peak shorebird migration (May 15th)
Early – Mid Jun	Pool should be completely drawn down to promote veg growth
Mid - Late Aug	Start gradual fill of pool in time for waterfowl migration (BWTE start end of August)
Sept – Oct	Fill pool gradually before freeze
Dec	Freeze



Date	Description
Early – Mid Jul	Start gradual drawdown to continuously expose new mudflats for shorebird migration (Jul -Oct, peak early Aug)
Sept – Nov	Fill pool gradually (before freeze) for waterfowl migration
Dec	Freeze

Despite the variation in timing of drawdowns and reflooding, one impoundment typically has some water during most of the spring, summer, and fall (though which impoundment contains water varies within a season). Each year, both impoundments are flooded before winter freeze, and remain flooded until the following spring. Water level management has been carefully documented each year since 2000 through weekly water level measurements. Appendix B contains graphs of water levels for each impoundment from 2000-2008. While participating in the second study described above, we also created bathymetry maps for each impoundment that correspond with the water level gauges. Thus, for any water level gauge reading, we can estimate what percentage of the impoundment is providing varying depths of water for resources of concern. We can also estimate the total water being held in each impoundment at any given time. Bathymetry maps and related water depth figures are in Appendix C.

There has also been substantial data collection to document the response of vegetation and birds during different water level management schemes. Fluctuating water levels through the spring, summer and fall have impacted vegetation by promoting seed germination and growth of a diversity of plants. Beneficial wetland plants that have dominated both impoundments during the last five years include: beggars ticks (*Bidens spp.*), Walter's millet (*Echinochloa walteri*) and umbrella sedges (*Cyperus spp.*). These and other resulting vegetation provide high quality forage for migrating waterfowl. Other common vegetation include: broad-leaved cattail (*Typha latifolia*), spike rush (*Eleocharis* spp.), marsh purslane (*Ludwigia palustris*), duckweed (Lemnaceae), smartweed (*Polygonum* spp.), arrow arum (*Peltandra virginica*), pickerelweed (*Pontederia cordata*), false nettle (*Boehmeria cylindrical*), buttonbush (*Cephalanthus occidentalis*), arrowhead (*Sagittaria latifolia*), soft-stemmed bulrush (*Scirpus validus*), wild rice (*Zizania aquatica*), American lotus (*Nelumbo lutea*), rushes (*Juncus* spp.) and *Panicum* spp. Annual drawdowns have also likely benefitted rare plants such as Engelmann's umbrella-sedge (*Cyperus engelmannii*) and Long's Bulrush (*Scirpus longii*), both state listed Threatened.

In addition, lower water levels typically lead to warmer water temperatures which results in increased stimulation of invertebrate production which benefits waterfowl, shorebirds, and likely turtles and fish. Drawdowns which result in puddling in the impoundments also concentrate fish and therefore provide optimal foraging habitat for wading birds and marshbirds.

Impoundment Management and Rare Species

The Concord Impoundments fall within Estimated and Priority Habitats designated by the Massachusetts Natural Heritage and Endangered Species Program. There are also numerous rare species accounts within the project area including: marshbirds such as common moorhen (*Gallinula chloropus)*, Pied-billed Grebe (*Podilymbus podiceps)*, Least Bittern (*Ixobrychus exilis),* and American Bittern (*Botaurus lentiginosus)*; herptiles such as Blanding's turtle (*Emydoidea blandingii)* and blue-spotted salamander (*Ambystoma laterale)* and; plants such as river bulrush (*Scirpus fluviatilis*) (see enclosed NHESP map; Figure 2).

Nesting Marshbirds

Although nesting marshbirds were not systematically surveyed prior to 2000 when the impoundments were managed primarily as full pools year round, we believe there is currently more nesting habitat in the impoundments for marshbirds than existed 10 years ago. Quality of nesting marshbird habitat has likely increased as a result of periodic drawdowns allowing for plant germination and spread in subsequent years. During marshbird callback surveys conducted over the last five years, we have recorded primarily Virginia Rails (*Rallus limicola*) and Soras (*Porzana carolina*), but we've also documented one pair of Least Bittern in most years, and occasionally one pair of American Bittern, Common Moorhen and Pied-billed Grebe. The majority of marshbirds are detected in the upper impoundment, where more marshbird habitat is available.

Although it's likely there are more marshbirds calling at the Concord Impoundments now compared to 10 years ago, we have not made any attempt to determine which portion of these calling birds actually initiated nests. In addition, we have not monitored nest success and do not know the impacts of spring and summer drawdowns on nesting marshbirds.

Blanding's Turtles

Three concerns have been discussed relative to potential impacts of water level management to Blanding's turtles and these are summarized below.

1. Previously, there was concern that Blanding's turtles may leave the Concord Impoundments during times of drawdowns, and subsequently cross commuter roads in search of habitat. Research of radioed animals have since shown that Blanding's turtles stay in the impoundments during drawdowns and very few animals have crossed Route 62 during these times.
2. Concerns have also been raised regarding impoundment water levels at the start of the winter season. A die-off of head-started Blanding's turtles occurred in the winter of 2004/2005, and other turtles and fish were found dead during this time. The die-off was

likely a result of anoxic conditions in the impoundments and could have been caused by low water levels, severe winter temperatures and prolonged periods of ice, or both. USFWS can help prevent this occurrence in the future by ensuring that water levels in the impoundments are as full as possible prior to the start of winter. However, this alone may not prevent anoxic conditions and winter die-offs in winters with extreme cold temperatures and prolonged periods of ice. In addition, researchers no longer release head-started turtles in one spot but rather now release turtles at the original nesting site and let them disperse on their own (while being monitored) to the impoundments and other wetlands.

3. Lastly, there is still concern regarding the potential loss of feeding opportunities for Blanding's turtles during drawdowns. Since juveniles often occupy shallower water than adults, they are likely to become "stranded" in mud sooner than adults during a drawdown, and the net result may be more time lost feeding. Additionally, since it's likely more important for juveniles to be foraging and putting on weight during the summer and early fall, they may be more negatively impacted than adults by lost feeding opportunities. However, nesting females will also need consistent high quality foraging opportunities.

   In 2009, a Masters student from Ohio University will focus his research on this issue and hopefully help us gain a better understanding of Blanding's turtles' habitat selection and foraging behavior during drawdowns. This work has already begun and will continue through September. The Masters student will be working closely with Refuge staff and researchers. In addition to this research, we propose methods for minimizing impacts to Blanding's turtles in both the short- and long-term management strategies.

Rare Plants

Annual drawdowns have also likely benefitted rare plants such as Engelmann's umbrella-sedge and Long's Bulrush, both state listed Threatened and both generally documented in the lower impoundment. Englemann's umbrella-sedge was last seen in the lower impoundment in 2000 and was not found during a search in 2005. Long's bulrush was last seen in the mid 1900s and was not found during a search in 1999. We do not believe it has been looked for in almost 10 years. In addition, small patches of river bulrush (*Bolboschoenus fluviatilis*, Special Concern) have been documented by Refuge staff in the lower impoundment. It's likely that periodic drawdowns benefit all three of these species.

Impoundment Management and Non-native Plant Species

Invasive species have been noted in the impoundments since the 1960's. The two plants of main concern have been water chestnut (*Trapa natans*) and purple loosestrife (*Lythrum salicaria*). By the late 1970s and early 1980s, water chestnut had become a major nuisance within both impoundments. Hand pulling, chemical treatment and mechanical harvesting were all attempted, but these methods were unsuccessful in the long term. Water drawdowns were identified in the early 1980s as a possible way to eliminate water chestnut from the impoundments. Drawdowns were attempted but were not successful until 2000. At that time, a regular drawdown schedule

was implemented in conjunction with research studies, and water chestnut subsequently decreased within both impoundments. Today, there is little water chestnut within the impoundments, except in areas where shallow water remains during drawdowns. Over the past few years, as drawing down the upper impoundment has become more difficult, the area in which water chestnut survives has increased. This year we are going to hand pull water chestnut in the hopes of keeping these plants to a small area.

Purple loosestrife has also been a problem in and around the impoundments. As opposed to water chestnut, purple loosestrife thrives during drawdowns. In an effort to control this invasive plant, both biological and chemical controls have been used. Rodeo was first used in the impoundments in the 1980s. It was used for a few years, and then not again until 2001. Rodeo was then used most years, through 2007. Rodeo was very successful at controlling the loosestrife along the edges of the impoundments, but application was much more difficult and less successful within the impoundments. In 2007, *Gallerucella* beetles were noted on loosestrife within the impoundments and it was determined that a more intensive biological control program would be implemented in order to control loosestrife at the impoundments. The biological control program began there in 1997. Releases occurred along the edges of the impoundments were river bulrush prevented the application of herbicide. These releases were typically less than 5,000 beetles per year. Larger scale releases (> 10,000 beetles) first occurred in 2005, with beetles being released within the impoundments for the first time in 2008. Beetles will continue to be released over the next few years until the population has reached a sufficient level to negatively impact the loosestrife.

Existing Conditions:

During the last two years we have had an increasingly difficult time draining the impoundments during the desired times of year, largely due to our drainage ditch system.[1] Over time, the ditches have refilled with sediment which makes the drainage management schemes less efficient and less predictable. In addition, sediment-filled drainage ditches increase the chances of fish being stranded on the impoundment surface when water does finally drain out. This was the case in May 2008, when over 1000 dead carp were pulled from the lower impoundment, following our annual drainage activities.

While there will be short-term disruption to the habitat and possible disturbance to species, maintenance work will result in better habitat over the long-term, and creation of wetland refugia will provide more habitat for herptiles during times of impoundment drawdowns. Our proposed short-term work plan and strategies for minimizing impacts are detailed below. The water level drawdown schedule outlined for the short-term work is very similar to our current long-term plan. However, the long-term management plans may change depending on results of research in this and future years.

Project Plans – Objective 1 – Maintain Ditches

[1] Difficulty managing the impoundment water levels also results from weather (spring and summer floods), but our ability to drain pools following flooding events is especially hampered by the current degraded integrity of the ditches.

The main drainage ditch within the lower and upper impoundments will be cleaned as early as possible during the next 1-5 years and we anticipate this maintenance will need to be repeated every 5-10 years. We are proposing different strategies for each impoundment, but recognize final implementation will be largely dependent on weather and equipment availability.

Upper Impoundment:

Description of Work: Following discussions with the NHESP, we propose to maintain the ditches in the upper impoundment, without fully draining the impoundment. We will close the outlet structure to prevent any outflow from the impoundment to the river and therefore won't have any additional impacts to wetland habitats. We anticipate being able to operate equipment in approximately 1-2 feet of standing water. If this preferred strategy is not feasible due to habitat conditions or equipment availability, we will default to conducting this work in a dry impoundment (conducting a full drawdown first).

Following discussions with NHESP we also propose to deposit material from the drainage ditches in "piles", rather than sidecasting the material as thin as possible, to create more topography and vegetated areas for Blanding's turtles and nesting marshbirds. We will try to avoid placing sediment immediately adjacent to the ditch edge so as not to interfere with sheet action drainage at times when we do need to drain the impoundment. Locations of proposed sediment placement are in Figure 3, but will ultimately be determined in the field at the time of implementation.

Timing of Work: Timing of ditch maintenance in the upper impoundment will depend on equipment availability but the earliest we plan to conduct the ditch maintenance work is August 2009.

Proposed Equipment: If available, the equipment used to clean out the ditches in the upper impoundment will be that of an amphibious (floating) excavator with a bucket attachment. An amphibious excavator can easily operate in shallow water and the bucket will allow for more controlled handling of material. If this equipment is not available, we would likely need to drain the impoundment and use an "Ultra Low Ground Pressure Equipment", or postpone work until the following year. This would be our least preferred option however.

Photos of this equipment are included in Appendix D.

Equipment Ingress and Egress: All ingress and egress of equipment will be performed off of existing dikes, as close as possible to the existing ditches and water control structures or in locations where the soil is most stable to minimize impacts from equipment transport (Figure 3). No mats or corduroy roads will be required for the moving of equipment within the proposed work area.

Lower Impoundment:

Description of Work: In contrast to the upper impoundment, we propose to maintain the ditches in the lower impoundment after a complete drawdown. We also propose to deposit material from the drainage ditches in "piles", rather than sidecasting the material as thin as possible, as described for the upper impoundment.

Timing of Work: Timing of ditch maintenance in the lower impoundment will depend on equipment availability and how quickly the impoundment is drained and the substrate dries sufficiently. The earliest we plan to start the drawdown in the impoundment is late June and it's likely that the earliest we could conduct ditch maintenance work is August 2009.

Proposed Equipment: The main ditch in the lower impoundment will be cleaned of accumulated sediment using the same or similar amphibious excavator with a bucket attachment for strategic placement of the fill. In addition to or in place of the proposed amphibious equipment, we will utilize "Ultra Low Ground Pressure Equipment" from the Mosquito Control Commission to excavate material from the ditches and deposit it in the best locations for wildlife.

Photos of this equipment are included in Appendix D.

Equipment Ingress and Egress: All ingress and egress of equipment will be performed off of existing dikes, as close as possible to the existing ditches and water control structures or in locations where the soil is most stable to minimize impacts from equipment transport (Figure 3). No mats or corduroy roads will be required for the moving of equipment within the proposed work area.

Justification and Efforts to Minimize Impacts in Both Impoundments:

By not fully draining the upper impoundment, we will likely minimize impacts to Blanding's turtles by maintaining more consistent feeding opportunities. This will be especially important in July for female Blanding's turtles which are replenishing energy reserves at the end of the nesting season, and for juveniles which are presumably putting energy into growth. Although we don't know the impact of drawdowns in the summer to nesting marshbirds, it is very likely that maintaining some water in the impoundment will benefit marshbirds tending nests or young.

Additionally waiting until at least August to conduct maintenance in the upper impoundment will minimize disturbance impacts to Blanding's turtles and marshbirds, which will have largely finished nesting. Depending on the timing of the work, there may be short-term disturbance to migrating waterfowl. However, the long-term benefit of better management capabilities offsets this short-term impact.

By fully draining the lower impoundment prior to conducting work, we will likely have some impacts to Blanding's turtles and marshbirds because the drawdown will result in

major habitat changes. However, we will not start the drawdown until late June or early July. By this time, Blanding's turtles will have completed nesting attempts, and many marshbird species will also be finished nesting. Normally, we would start refilling the pool in late August or early September in time for waterfowl migration. However, since we are proposing to drawdown the pool at a later date than in past years, we will likely have delayed plant germination and growth, which will extend the optimal flooding time of this impoundment (based on plant maturation and waterfowl food production) until later in the season. If work is not completed until October or November, we will have short-term impacts due to reduced waterfowl habitat during migration, but we feel these short-term impacts are offset by the increased long-term management capability. And, since we'll be maintaining water in the upper impoundment, there will still be some habitat available for migrating waterfowl.

In general, Blanding's turtles are likely to be less active in August, minimizing chances of direct disturbance while operating equipment. However, we will have a portion of Blanding's turtles outfitted with radio transmitters in both impoundments and will be aware of their locations during ditch maintenance work. Biologists will be on site during the work, and although we won't know where every Blanding's turtle is, the known locations of the subsample will help us minimize the chances of direct take from equipment operations. Based on past studies, we don't expect Blanding's turtles to be using the ditches during drawdowns, so direct impacts during equipment operation are slim. However, other turtle species may be using the ditches, and operators will take care to prevent any take.

Currently, both impoundments have very little relief in topography and we would like to create areas of higher elevation in some portions to support plant growth and provide more diverse vegetated habitat for all species using the impoundments (turtles, marshbirds, and migrating waterfowl). Blanding's turtles do not like to use habitat that consists of open water with little vegetation. At full water levels, the lower impoundment has very little emergent vegetation, and although the upper impoundment has more vegetation, there are still large areas of open water. In particular, increased cattail edge or other thick emergent vegetation will benefit Blanding's turtles and nesting marshbirds.

Additionally, creating an increase in relief of elevation may allow us the option of partially draining the impoundments in the future to expose some mudflats, and stimulate emergent vegetation growth, while still maintaining some portions of the impoundment in standing water. Locations of proposed increased elevation are in Figure 3. These areas were chosen to maximize the chances of building elevation in areas with solid substrate and to also build on current patches of habitat that contain a mosaic of open water and emergent vegetation.

We will ensure that sediment is not placed on rare plants, but note that increased elevation could support more rare plants in the future. These elevated areas will also provide habitat for non-native plant species and we are currently investigating the potential of planting these areas with native vegetation from each impoundment (such as

cattail or wild rice). The final species chosen for planting will depend on the final elevation of these created areas.

Since this proposed work does not affect the total amount of sediment in each impoundment, and the total area being manipulated is relatively small, we do not expect that the flood storage capacity of the impoundments will be significantly altered. And, since we aren't proposing any changes to the dike system itself, river height and natural rainfall will continue to be the primary drivers of impoundment flooding.

If we are not able to create areas of higher elevation using sediment, we will use equipment with a rotary ditching head which casts the excavated material very thinly over a larger area. By utilizing this type of equipment we are virtually eliminating our equipment foot print as well as the impacts from depositing the excavated material. Because the rotary ditcher can cast material nearly 40 feet, the resulting deposition is usually only a few centimeters deep, having no significant impact on the bottom elevation or topography of the wetlands. The material removed from the ditches is comprised of suspended organic material (very wet muck). By casting the material thinly we are also able to retain and spread native seed of beneficial plants over a larger area. However, this will also increase the likelihood of spreading non-native plant seed as well.

Project Plans – Objectives 2 and 3 – Clean Existing and Create Additional Refugia

The current existing refugia in the upper pool will be cleaned as soon as possible during the next 1-5 years and we anticipate this maintenance will need to be repeated every 5-10 years. We are also proposing to create up to two additional refugia in each impoundment.

The existing refugia in the upper impoundment is a short, enlarged section of the ditch in the vicinity of the observation tower, which was constructed to serve as refugia for aquatic life during periods of drawdown or hot weather, as well as to provide an area in which young-of-the-year wading birds might find enhanced foraging opportunities (Figure 3). We propose to remove any built up sediment in this refugia using the same techniques described above for the ditch maintenance in the upper impoundment.

Creating additional refugia will benefit reptiles and amphibians during drawdown periods and create increased foraging opportunities for wading birds. We will target areas that don't have an abundance of wetland vegetation if possible, but locations will be largely dependent on sediment composition and firmness (feasibility of equipment access), and areas where priority species have been known to congregate. Potential locations are shown on Figure 3. We are proposing up to four refugia pools be created, but they may be created through the next five years, depending on staff time, funding, and equipment availability. We propose each refugia pool to be about 10,000 square feet in area, and about 24 inches deep (which allows a water level of 12-18 inches to be maintained during dry times. Although the material removed to create these pools will be more consolidated than that removed from the existing ditches, it is still comprised mainly of organic material, thus creating a good seed bed for plant germination. We propose to use this sediment to create diversity of elevation in other areas of the impoundments, as described above for the ditch maintenance work.

Affected Area:

The approximate dimensions of the ditches, with the calculated areas and/or volumes are displayed in Table 1 according to the pertinent Resource Areas described in the Massachusetts Wetland Protection Regulations, 310 CMR 10. The impoundments are physically within multiple Resource Areas; for example, the Land Under Water Bodies and Land Subject to Flooding Resource Areas found in the impoundments overlap each other in their entirety; and, the Riverfront Resource Area potentially affected also physically overlaps portions of the previously listed two Resource Areas in its entirety.

We plan to clean the ditches to their original width of 7 feet and depth of 4 feet; therefore, all calculations were based on these figures. The ditches are not completely filled with sediment and our calculations reflect and estimated depth of 2 feet of sediment.

Cleaning all of these ditches once will result in a total area affected equal to 39,634 square feet and a total of 2,936 cubic yards removed from this area. Most of this area is bordered by wetland vegetation (depending on the water levels) and this maximum is therefore included on the WPA Form, Section B2.

The existing refugia in the upper impoundment covers approximately 5,400 square feet. If it were completely refilled with sediment, it would contain approximately 800 cubic yards of organic material (wet muck). We estimate that it is currently filled 50% with sediment. We estimate each new refugia pool to be about 10,000 square feet in area, and about 24 inches deep (which allows a water level of 12-18 inches to be maintained during dry times. These four new pools would total about 40,000 square feet of area, and with a depth of 2 feet, would result in 2,963 cubic yards of excavated material.

Table 1. Calculations for Drainage Ditches

Drainage Ditch	Map Reference	Length (ft)	Width (ft)	Depth (ft) to Remove	Total Area Affected (sq ft)	Proposed Sediment Removed (cu yds)
Lower Pool	1	2,428	7	2	16,996	1259
Upper Pool	2	1,512	7	2	10,584	784
Upper Pool	3	1,722	7	2	12,054	893
TOTALS		**5,662**			**39,634**	**2,936**

Table 2. Calculations for Pool Refugia

Refugia Pool	Map Reference	Total Area Affected (sq ft)	Proposed Sediment Removed (cu yds)
Existing Pool	Yellow oval	5,400	400
Proposed Pools	Yellow circles	40,000 (4 pools)	2,963
TOTALS		**45,400**	**3,363**

Table 3. Impact Numbers for each Resource Area

Lower Impoundment

APPROXIMATE SIZE / QUANTITY	Total	Lands Subject to Flooding	Riverfront Area
Drainage Channel (s) Length (ft)	2428	2428	200
Drainage Channel (s) Width (ft)	7	7	7
Drainage Channel (s) Depth (ft)	2	2	2
Total Area of Impoundment / LSF / Riverfront	4356000	4356000	648000
Drainage Channel (s) Area (ft squared, LxW)	16996	16996	1400
Drainage Channel (s) Maximum Sediment Volume (ft cubed, LxWxD)	33992	33992	2800
Drainage Channel (s) Maximum Sediment Volume (yd cubed, LxWxD/27)	**1259**	**1259**	**104 total, about 52 of riverfront actually falls in ditch inside impoundment**

Upper Impoundment

APPROXIMATE SIZE / QUANTITY	Total	Lands Subject to Flooding	Riverfront Area
Drainage Channel (s) Length (ft)	3234	3234	200
Drainage Channel (s) Width (ft)	7	7	7
Drainage Channel (s) Depth (ft)	2	2	2
Total Area of Impoundment / LSF / Riverfront	4356000	4356000	378000
Drainage Channel (s) Area (ft squared, LxW)	22638	22638	1400
Drainage Channel (s) Maximum Sediment Volume (ft cubed, LxWxD)	45276	45276	2800
Drainage Channel (s) Maximum Sediment Volume (yd cubed, LxWxD/27)	**1677**	**1677**	**104 total, about 52 of riverfront actually falls in ditch inside impoundment**

Refugia

APPROXIMATE SIZE / QUANTITY	Total	Lands Subject to Flooding	Riverfront Area
New Refugia Area (ft squared, per Refugia	10,000	10,000	0
Total for 4 Refugias (ft squared)	40,000	40,000	0
Refugia (s) Depth (ft)	2	2	0
Existing Refugia Area (ft squared) Refugia	5,400	5,400	0
Refugia (s) Depth (ft)	2	2	0
Total Sediment to be Removed for all 5 Refugia (ft cubed)	90,800	90,800	0
Total Sediment to be Removed for all 5 Refugia (yd cubed)	**3363**	**3363**	**0**
Total Area of Sediment Placed (2 ft Avg Elevation, sq feet)	85034	45400	0
Total Area Impacted by Sediment Placement (acres)	**2**	**2**	**0**

Riverfront Area Alternatives Analysis:

Approximately 1026000 square feet (5130 ft x 200 ft; 23.5 acres) of Riverfront Area exists at the Concord Impoundments along the Concord River. However, a very small portion of the Riverfront Area will actually be impacted by this project - about 1400 square feet (200 ft x 7 ft ditch width), distributed between the two impoundments. We will not conduct ditch maintenance work on the outer edge of the impoundments and thus are reducing our overall impact to the Riverfront Area. Therefore, as much of the project as is feasible is already being sited outside of the Riverfront Area. However, siting the project entirely outside the Riverfront Area is not practicable. Conducting maintenance work along the entirety of the ditches inside the impoundments is critical to management capability. If we only maintain the portion of the ditches that is outside of the Riverfront Area (analogous to a No-Action Alternative), this will exclude the portion of the ditches closest to our water control structures where we often have large sediment build up. This will compromise the entire project and prevent us from effectively managing these impoundments for trust resources.

Long-term Management:

Depending on results of monitoring and research in 2009, we will likely continue managing the upper impoundment more for the benefit of Blanding's turtles and marshbirds. We would discontinue drawdowns in most years, but would still need to conduct occasional drawdowns to restimulate emergent vegetation growth. We will closely monitor the vegetative response in 2009 as well as the differential foraging opportunities for Blanding's turtles in the two impoundments with different management regimes. Since the overflow elevation of the upper impoundment to the lower impoundment will not change, we will still be able to occasionally drain some water from the upper impoundment to prevent flooding of adjacent properties as a result of maintaining a full impoundment. However, during times of heavy rains and river flooding we have no management capability to prevent flooding of the impoundments and adjacent wetlands. We will also likely continue managing the lower impoundment more for the benefit of migrating waterfowl and rare plants by continuing annual drawdowns. We will closely monitor the vegetative response in 2009 with our proposed later drawdown date to determine if a later drawdown impacts our ability to provide high quality food for migrating waterfowl. We expect that well-maintained ditches will increase our ability to quickly drain the impoundment, and the net result may be the same as in past years when we started the drawdown earlier in the season, but drained the impoundment much more slowly. Purple loosestrife and water chestnut will continue to be an issue at the impoundments. With less frequent drawdowns in the upper pool, water chestnut will have the ability to spread rapidly. Hand pulling will be attempted to keep this plant in control, but if this methods fails, then chemical control will be needed in years when drawdowns are not implemented. Loosestrife will continue to be a problem in both impoundments. Biological control will be our primary form of control. If biological control is not effective at this site, Rodeo will be used to control plants within the impoundments and along the edges.

List of Figures and Appendices:

Figure 1. Map of Concord Impoundments, Dikes and Water Control Structures
Figure 2. Natural Heritage and Endangered Species Program Map
Figure 3. Estimated locations of Refugia, Sediment Placement and Equipment Paths
Appendix A. Establishing Refuge Resources of Concern
Appendix B. Graphs of Water Levels in Upper and Lower Impoundments 2000-2008
Appendix C. Bathymetry Maps and Estimates of Water Depths
Appendix D. Photos of Proposed Equipment
Appendix E. USGS Topo Map of Concord Impoundments

Figure 1. Great Meadows National Wildlife Refuge
Location of Ditches and Water Control Structures at Concord Impoundments

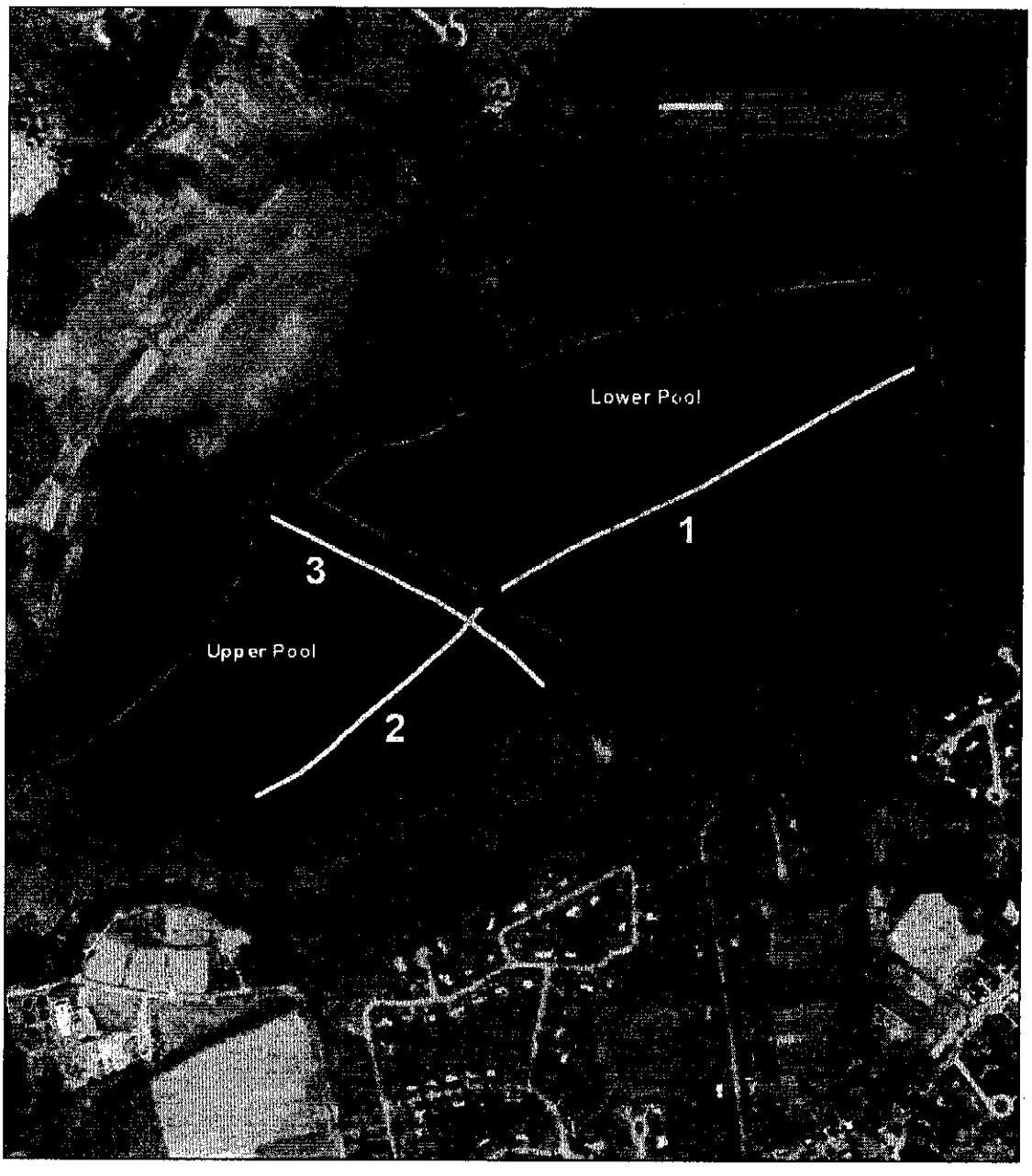


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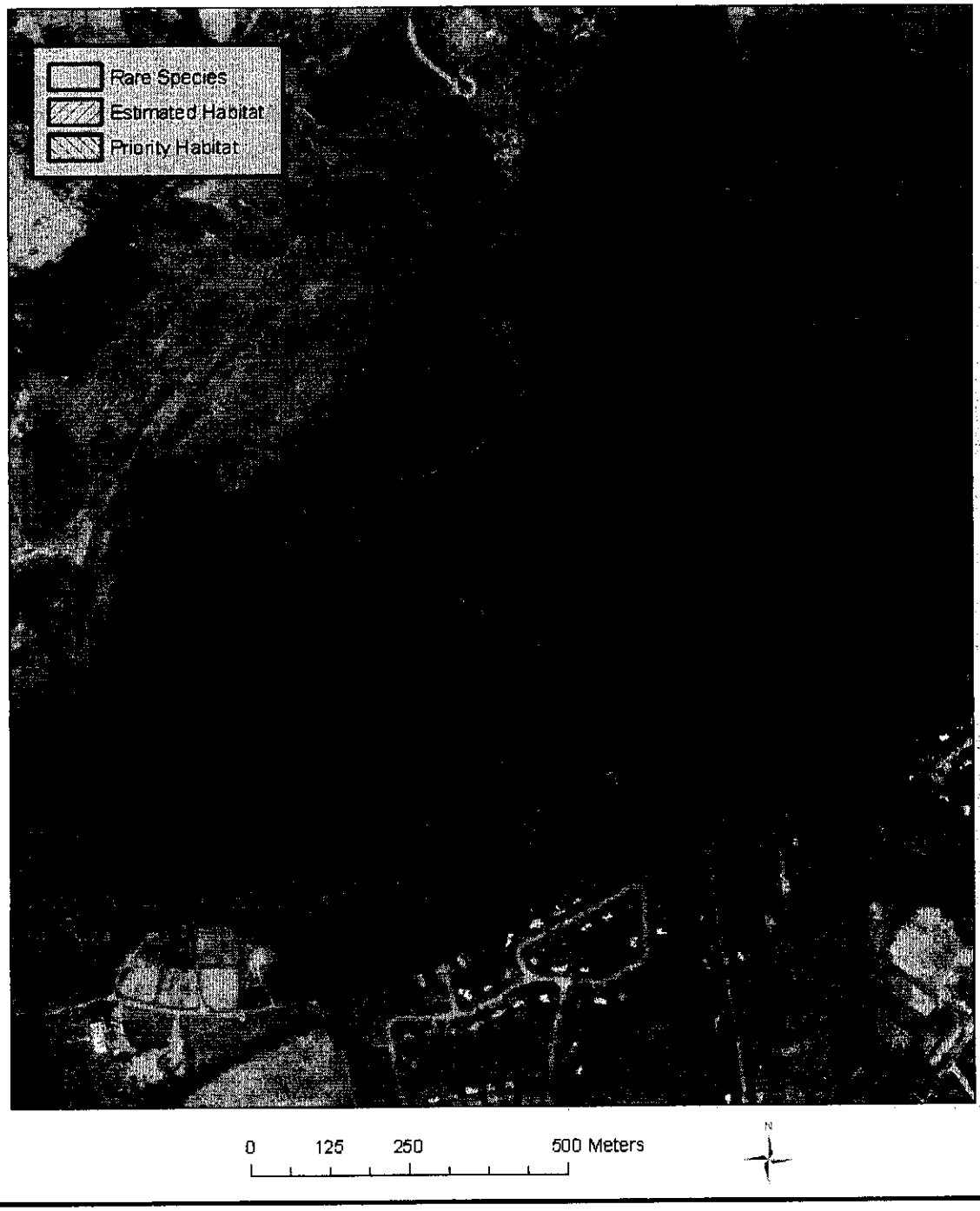
Figure 2. Great Meadows National Wildlife Refuge
Estimated and Priority Habitat based on NHESP Data



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U.S. FISH & WILDLIFE SERVICE

Figure 3. Great Meadows National Wildlife Refuge
Location of Existing and Potential Locations of Pool Refugia, Sediment Placement and Equipment Ingress and Egress at Concord Impoundments

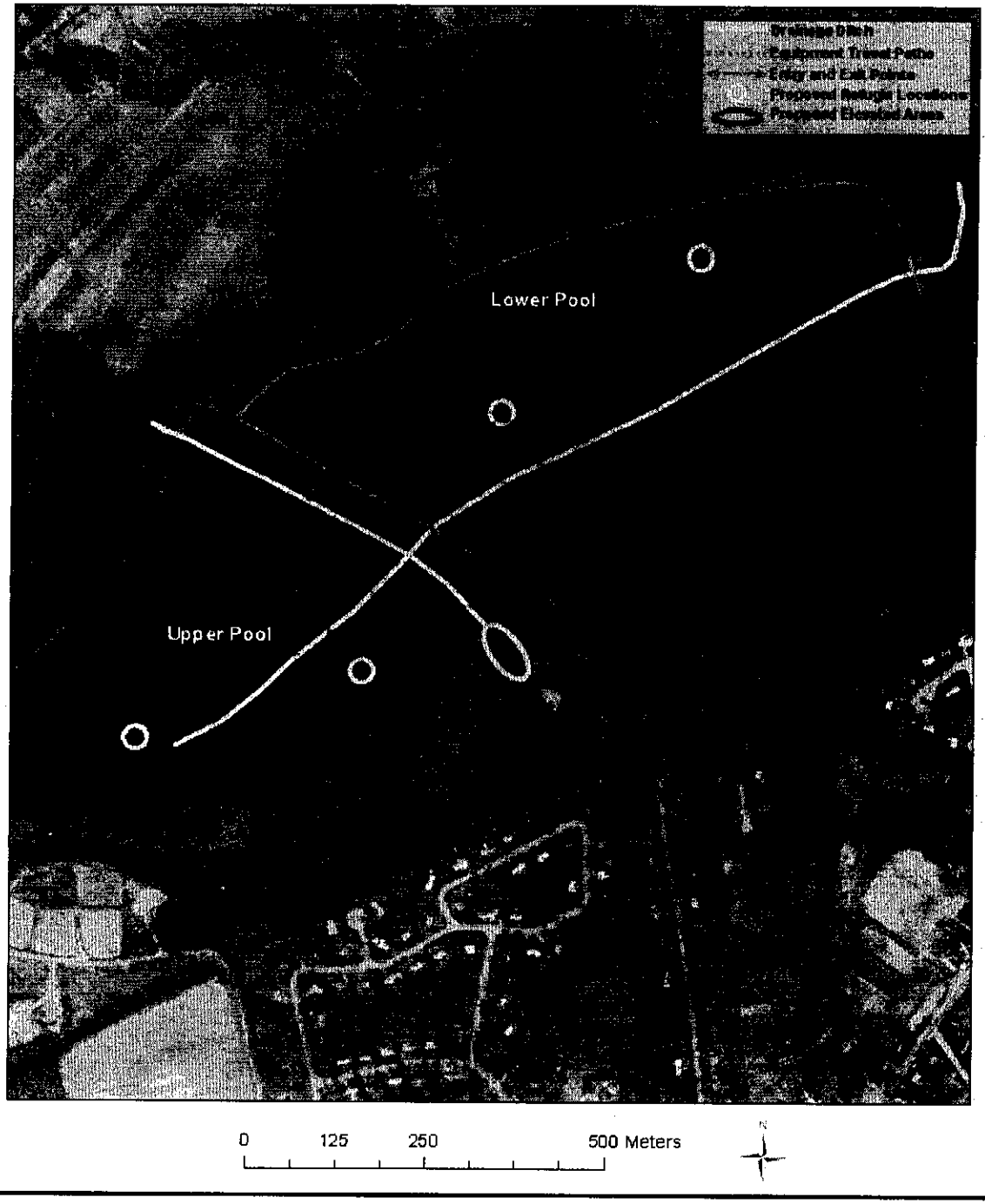
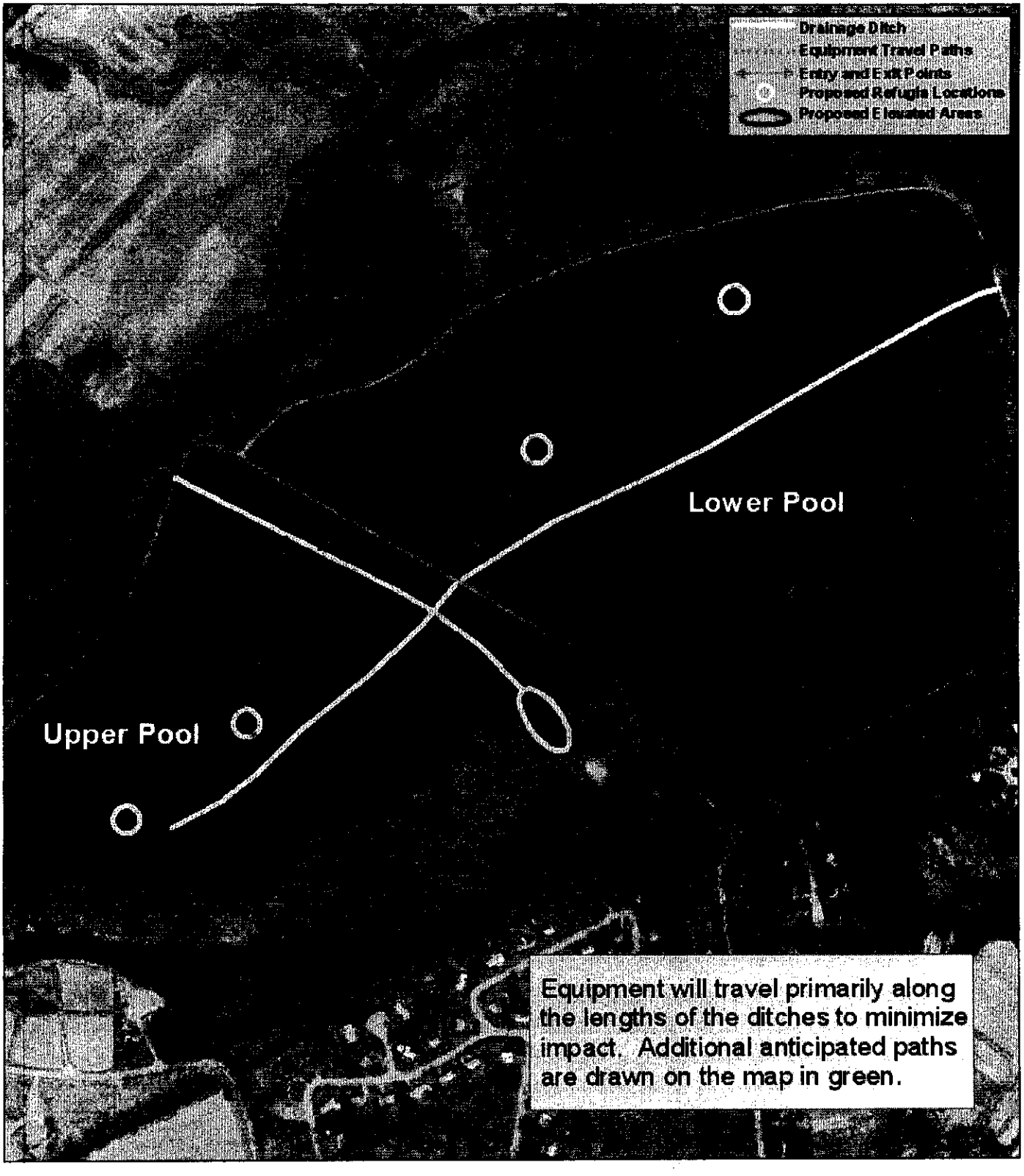


Figure 3. Great Meadows National Wildlife Refuge
Location of Existing and Potential Locations of Pool Refugia, Sediment Placement and Equipment Ingress and Egress at Concord Impoundments



Appendix A
Identifying Resources of Concern and Management Priorities for a Refuge[2]

Step 1: Identify Refuge Purposes

The Refuge System Improvement Act, and subsequent policy, requires that each refuge be managed to fulfill both its establishment purpose and the mission of the Refuge System. The Policy, *National Wildlife Refuge System Mission and Goals and Refuge Purposes* (601 FW 1), explains the relationship between these two. Where there is a conflict, individual refuge purposes have priority.

Step 2: Identify NWRS Resources of Concern

NWRS Resources of Concern are identified in the National Wildlife Refuge System Mission Goals and Refuge Purposes Policy (601 FW 1). Specifically, this policy states:

> "We will manage each refuge to fulfill the specific purpose(s) for which that refuge was established and the Refuge System mission. These goals will help guide development of specific management priorities during development of CCPs. Setting and implementing management priorities will help us achieve the purposes of the refuge, and, to the extent practicable, the Refuge System mission. The priorities for management activities and uses are: (1) conserving fish, wildlife, and plants and their habitats (Goals A, B, and C); (2) facilitating compatible wildlife-dependent recreational uses (Goals D and E); and (3) considering other appropriate and compatible uses. " (601 FW 1.10)
>
> "The goals in this policy provide guidance for accomplishing the Refuge System mission and directives on managing the Refuge System under the Administration Act, as amended. Collectively, these goals articulate the foundation for our stewardship of the Refuge System and define the unique and important niche it occupies among the various Federal land systems." (601 FW 1.11)
>
> "... Refuge System goals will help guide the development of comprehensive conservation plans (CCP) and the administration, management, and growth of the Refuge System..." (601 FW1.8)

The first 3 NWRS goals (601 FW 1.8) identify the natural resource conservation priorities for the System.

> "**A.** Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
>
> **B.** Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
>
> **C.** Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts."

Goals A and C address in part, the NWRS' legal mandate to maintain BIDEH. Together with the species identified in Goal A (threatened and endangered species) and Goal B (migratory birds, anadromous and interjurisdictional fish, and marine mammals) along with their supporting habitats are priorities for the NWRS and are considered NWRS Resources of Concern.

These species groups are also identified in numerous Federal statutes and international treaties (for example, see the Migratory Bird Treaty Act of 1918, as amended [16 U.S.C. 703-712] and the marine Mammal Protection Act of

[2] Taken from Draft Handbook, USFWS, August 2008.

1972, as amended [16 U.S.C. 1361-1471h]) as natural resource management priorities for the entire Fish and Wildlife Service and are often referred to as FWS "Trust Species". Consistent with the NWRS Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee), management to achieve its establishment and acquisition purpose(s) is the first and highest priority for each refuge. Secondarily, each refuge should be managed to achieve the NWRS mission. Consistent with these responsibilities, refuges should also be managed to support the species groups and their habitats listed above, and thereby comply with the associated Federal statutory mandates and help achieve the NWRS' goals.

Habitats or plant communities are also NWRS Resources of Concern when they are specifically identified in refuge purposes, when they support species or species groups identified in refuge purposes, and/or when they are important in the maintenance or restoration of BIDEH.

Each of these groups of NWRS Resources of Concern (FWS Trust Species) is further described below.

- Migratory Birds: A list of all species of migratory birds protected by the Migratory Bird Treaty Act (16 U.S.C. 703–711) and subject to the regulations on migratory birds is contained in subchapter B of title 50 CFR § 10.13. The Migratory Birds Program also maintains subsets of this list that provide priorities at the national, regional, and ecoregional (bird conservation regions) scales.

- Interjurisdictional Fish: Interjurisdictional fish are those "...populations that two or more States, nations, or Native American tribal governments manage because of their geographic distribution or migratory patterns (710 FW 1.5H)." Examples include anadromous species of salmon and free-roaming species endemic to large river systems, such as paddlefish and sturgeon (601 FW 1).

- Threatened and Endangered Species: The Endangered Species Act (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984 and 1988) states in SEC. 8A.(a) that "The Secretary of the Interior... is designated as the Management Authority and the Scientific Authority for purposes of the Convention and the respective functions of each such Authority shall be carried out through the United States Fish and Wildlife Service." The Act also requires that "all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

- Marine Mammals: The Marine Mammal Protection Act of 1972 (16 U.S.C. 13611407) prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. The following is a list of marine mammals under the jurisdiction of the FWS:
    - West Indian Manatee (Antillean and Florida);
    - Polar Bear (AK Chukchi/Bering Seas and Beaufort Sea);
    - Pacific Walrus (AK); and
    - Sea Otter (South Central AK, Southeast AK, Southwest AK, CA, and WA).

Step 3: Address BIDEH

While achieving refuge purposes and the Refuge System mission, the Refuge Improvement Act, directs the NWRS to consider BIDEH

> "In administering the System, the Secretary shall...ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans..." (Refuge Improvement Act, Section 4(a)(4)(B)).

This requires that we consider and protect the broad spectrum of native fish, wildlife, plants, and habitat resources found on a refuge. The *Policy on Biological Integrity, Diversity and Environmental Health* (601 FW 3.3) provides information and guidance to manage the refuge in such a way to maintain existing as well as restore lost or severely degraded components of BIDEH, where appropriate.

The policy explains the relationships among BIDEH, the NWRS mission, and refuge purposes as follows:

> "...each refuge will be managed to fulfill refuge purpose(s) as well as to help fulfill the System mission, and we will accomplish these purpose(s) and our mission by ensuring that the biological integrity, diversity, and environmental health of each refuge are maintained, and where appropriate, restored." (601 FW 3.7B).

In simplistic terms, elements of BIDEH are represented by native fish, wildlife, plants, and their habitats as well as those ecological processes that support them.

Most significant within the policy is the definition of BIDEH, which establishes historic conditions as a reference for implementation. Historic conditions are defined and qualified in the policy as follows:

> "Composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human related changes to the landscape" (601 FW 3.6D.).

> "We consider the natural frequency and timing of processes such as flooding, fires, and grazing. Where it is not appropriate to restore ecosystem function, our refuge management will mimic these natural processes including natural frequencies and timing to the extent this can be accomplished [601 FW 3.10A.(4)]."

The policy on BIDEH requires careful examination of the refuge's historic conditions, the processes that maintained them, changes on the landscape that have altered those conditions or processes, and the remnant habitats or populations still present or that might be restored. Using the policy guidance, you must decide which of these you will manage for, and to what degree.

Remember historic conditions were dynamic, not static. Ecological communities (such as prairies, shrublands, and woodlands) moved back and forth via natural processes. As a result, it is not necessary to maintain refuge habitats at a specific point in historic time (e.g., early successional prairie), but may choose to manage within a natural range of variability. This strategy maintains processes that allow species, genetic strains, and natural communities to evolve with changing conditions.

The BIDEH also directs the NWRS to consider multiple landscape scales of BIDEH as follows:

> "Biological integrity, diversity, and environmental health can be described at various landscape scales from refuge to ecosystem, national, and international...Individual refuges contribute to biological integrity, diversity, and environmental health at larger landscape scales, especially when they support populations and habitats that have been lost at an ecosystem, national, or even international scale. In pursuit of refuge purposes, individual refuges may at times compromise elements of biological integrity, diversity, and environmental health at the refuge scale in support of those components at larger landscape scales. [601 FW 3.7C]"

Individual refuges contribute to BIDEH both locally and at larger landscape scales. The former occurs when you examine local or site-specific historic conditions and processes. Examples are protecting patches of unplowed prairie or fens, restoring agricultural fields to woodland, or removing a dam to establish historic stream flow. The latter occurs when you realize the refuge must support populations and habitats that have declined or been lost at an ecosystem, national, or even international scale (flyway). Examples are waterfowl refuges within California's Central Valley. Many of these refuges are islands of habitat surrounded by urban areas or intensive agriculture. They were established to provide nesting, migration, and wintering areas for migratory waterfowl and waterbirds in the face of such landscape-level changes. Such refuges must maintain wetland habitats and hydrologic regimes not historically present. Therefore, they forego some local elements of BIDEH in support of those components at larger landscape scales. Even these refuges, however, generally have local elements of BIDEH (such as vernal pools or unplowed grassland) that they can preserve or restore while meeting BIDEH at landscape-scales.

Maintaining or mimicking natural processes is another principle of BIDEH that assists with identification of priority resources for the maintenance and restoration of BIDEH on the refuge.

> "Management, ranging from preservation to active manipulation of habitats and populations, is necessary to maintain biological integrity, diversity, and environmental health. We favor management that restores or mimics natural ecosystem processes or functions to achieve refuge purpose(s). Some refuges may differ from the frequency and timing of natural processes in order to meet refuge purpose(s) or address biological integrity, diversity, and environmental health at larger landscape scales. [601 FW 3.7D]"

Ideally, to meet the letter and spirit of the policy, you would maintain or duplicate historic processes (such as floods or wildfire), mimicking as much as possible historic timing, frequency, and intensity. However, given changing conditions and landscape patterns (e.g., economic development) of the last century or more, it is often not feasible to rely on natural processes. Selection of resources required to maintain or restore BIDEH should consider if natural processes responsible for them are still intact. If not, are management strategies available that can be implemented to mimic natural processes so that elements of BIDEH can be maintained or restored on the refuge. The maintenance and, where appropriate, restoration of BIDEH provides tremendous flexibility in the selection of management priorities for a refuge. Although legislatively mandated requirements for management of NWR purposes will be the highest priority for management, most refuges have associated with them significant elements of BIDEH that must be maintained or potentially restored. The BIDEH policy provides the NWRS an opportunity to consider and protect a broad spectrum of fish, wildlife, plant, and habitat resources as well as the processes that support them found on refuges and associated ecosystems.

Step 4: Compile Comprehensive List of Refuge Resources of Concern

Using the information that describes refuge purposes, NWRS Resources of Concern (FWS Trust Species), and elements of BIDEH, compile a list of all species, species groups, and vegetation communities (habitats) that could be of management concern for the refuge. When identifying Refuge Resources of Concern, you must determine if *habitat/vegetation communities that meet the life history needs of these species are present or can be restored on the refuge*. Effectively, this list includes everything on and around the refuge addressed in the Refuge System's legal and policy mandates. In addition to these species and vegetation communities, include appropriate state-listed species and priority species identified in state wildlife action plans.

Various plans, reports, and datasets developed by the FWS or in cooperation with our conservation partners provide information to identify species and habitats that are, or could be, supported by the refuge. Here are some examples:

- Existing refuge species lists;
- Technical papers or reports identifying species or species groups, vegetation communities, habitat requirements, and life history needs for the ecoregion;
- Refuge inventory and monitoring data;
- Ecosystem assessment data from the Nature Conservancy;
- Trend and status maps for birds in BCR plans;
- Local university plant and animal collections;
- State wildlife action plans;
- Fisheries Management Plans;
- State Natural Heritage Program rankings for rare plants and natural communities;
- State priority habitat and species plans; and
- Federally listed species recovery plans.

Step 5: Identify Priority Refuge Resources of Concern

The Comprehensive Refuge Resources of Concern Table developed in Step 4 contains the full array of species and vegetation communities addressing a broad range of conservation needs. Now you must selectively reduce this table to those species and vegetation communities that will be managed to fulfill our obligations to refuge purposes, NWRS Resources of Concern, and BIDEH.

Selecting priority Refuge Resources of Concern from the comprehensive list uses the "focal species" concept. Focal species are highly associated with important habitat attributes or conditions that represent the needs of larger guilds of species that use habitats and respond to management similarly. By managing for focal species, important components of functional, healthy ecosystems will also be addressed. The use of focal species is particularly valuable when addressing FWS trust resources such as migratory birds. The process in this handbook is consistent with the Service's SHC framework. The SHC approach uses focal species to identify important habitats at the landscape or ecosystem scale that if protected, restored, or managed facilitate the Service's responsibility to conserve wildlife populations.

A filtering strategy can be used to help you select the appropriate focal species. We suggest a filtering strategy that uses site capabilities, predicted management response, and expert input. Together with these filters you should rely on your own professional judgment, as well as other resources professionals with state, federal, and private resource agencies as well as academia to assist with identification of focal species. Also seek advice from resource professionals engaged in the development of species habitat models for the SHC program.

The first filter to help you select focal species that will become your list of priority Refuge Resources of Concern is assessment of refuge "site capabilities". Often physical conditions and processes on or around the refuge may limit its ability to support certain Refuge Resources of Concern. Such conditions include patch size, connectivity of habitats, land cover, soil type, hydrology, topography, contaminants, urban/industrial encroachment, roads, climate change, invasive species, predation, and disease. Select a resource of concern as a *priority* only if the refuge has the capabilities (currently or through restoration) to provide the habitat components necessary for the specific life cycle needs of the species when it occupies the refuge.

The second filter is evaluation of how well a resource of concern will "respond to management or restoration" of habitat or habitats used by the species when it occupies the refuge. Select species and vegetation communities as priority Refuge Resources of Concern that respond to habitat management or restoration.

The third filter is adoption of "prioritization rankings" from Service programs, partner agencies and organizations, and other available experts. Many Regional FWS offices, state wildlife agencies, universities, and NGOs have special expertise on NWRS Resources of Concern, and they have prioritized them for conservation purposes. Examples of these rankings include NatureServe G and S ranks, PIF scores, and FWS prioritization scores for threatened and endangered species. While using the first two filters also consider rankings.

These filters should be considered equally when identifying priority refuge resources of concern.. When identifying Refuge Priority Resources of Concern, use these filters simultaneously. As noted previously, it is important to rely on your professional judgment and the opinions of trusted experts. In addition to the filters described above, consult handbooks and other literature developed for implementation of the SHC framework to facilitate the selection of focal species.

Step 6: Identify Priority Habitats

In Step 5, you identified priority Refuge Resources of Concern and the habitats on which those resources depend. You also identified the habitat characteristics or attributes required by each species (Table 5). Because the NWRS

primarily manages vegetation communities, or habitats, we linked priority refuge Resources of Concern to habitats that provide for their life cycle needs while they utilize the refuge. The specific *characteristics* or attributes of each habitat will be used to construct measurable objectives.

In this section we identify the highest priority habitats to manage on the refuge. These may be habitats that already exist, or ones that can be restored. Typically, high priority habitats will correspond to the highest priority Refuge Resources of Concern or will benefit the broadest number of Refuge Resources of Concern. High priority habitats are those which can be actively managed, maintained, or restored. Low priority habitats benefit fewer or less important Refuge Resources of Concern. Alternatively, these lower priority habitats may not require management, or they may be beyond our authority or ability to manage.

Simplistically, we define these two habitat categories as "Priority I" and "Priority II" habitats. By focusing on the former, refuge resources will be used to manage habitats for the highest priority Refuge Resources of Concern. Those in the latter category are still important, providing value to a range of species and contributing to the overall biodiversity of the refuge. They may also be important communities that do not require active management or that we lack authority to manage. These habitats will be managed, if necessary, when refuge, resources allow. For Step 6, you will use the factors identified below to rank habitats as priority I or II. Also in Table 6, explain why you ranked each habitat Priority I or II, and identify those factors which may constrain your management of each habitat.

The following factors to identify habitats as either Priority I or Priority II:

Priority I

- Can be managed to provide the greatest conservation benefit to priority species, especially those specifically identified in the refuge purpose.
- Offer the greatest contribution to native habitats (BIDEH) not well represented within the landscape (including the broader ecoregion of which the refuge is a part) and address conservation needs of NWRS Resources of Concern.
- Habitat condition or other factors suggest an urgent need for active management.

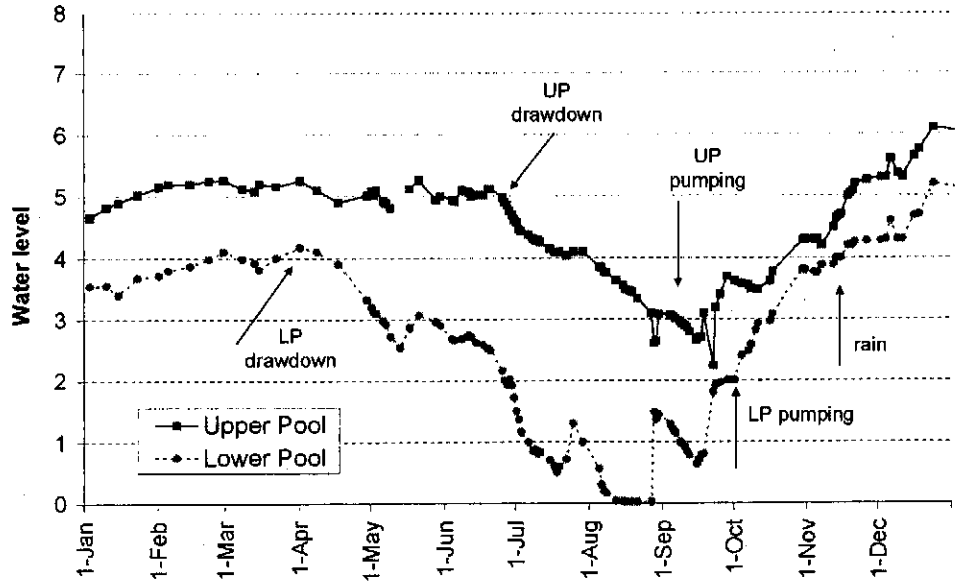
Priority II

- To limited in extent to make a meaningful difference
- Outside the management authority or jurisdiction of the refuge

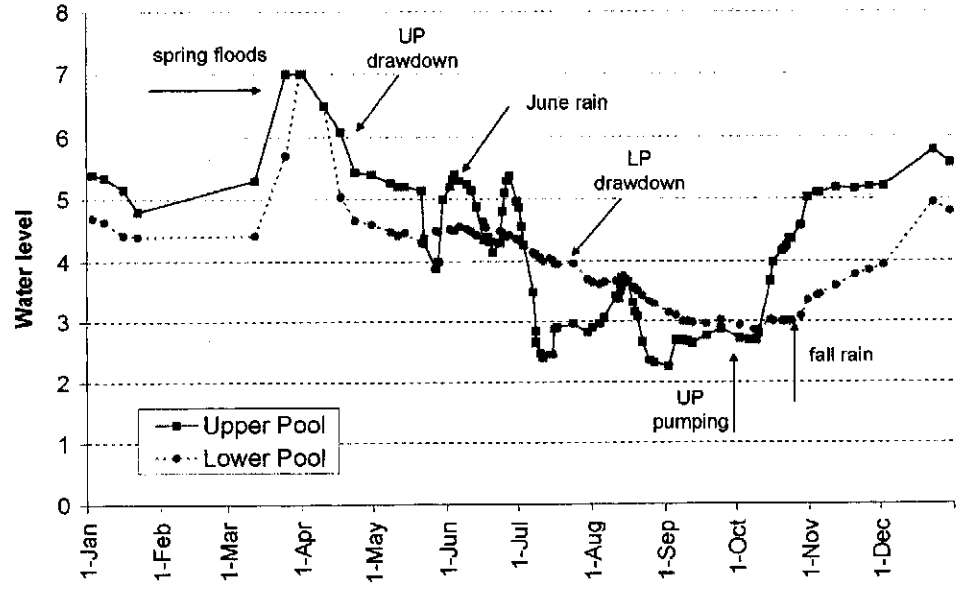
Priority I and II management categories are most useful for long-term planning. On a year-to-year basis, the actual habitats you choose to work on will vary, depending on resource conditions, needs, management cycles, and available staff and time. These are decisions you will make when preparing your annual habitat work plans. Also, changes on the landscape may push Priority II habitats into the higher category.

Appendix B
Water Levels at Concord Impoundments, 2000-2008

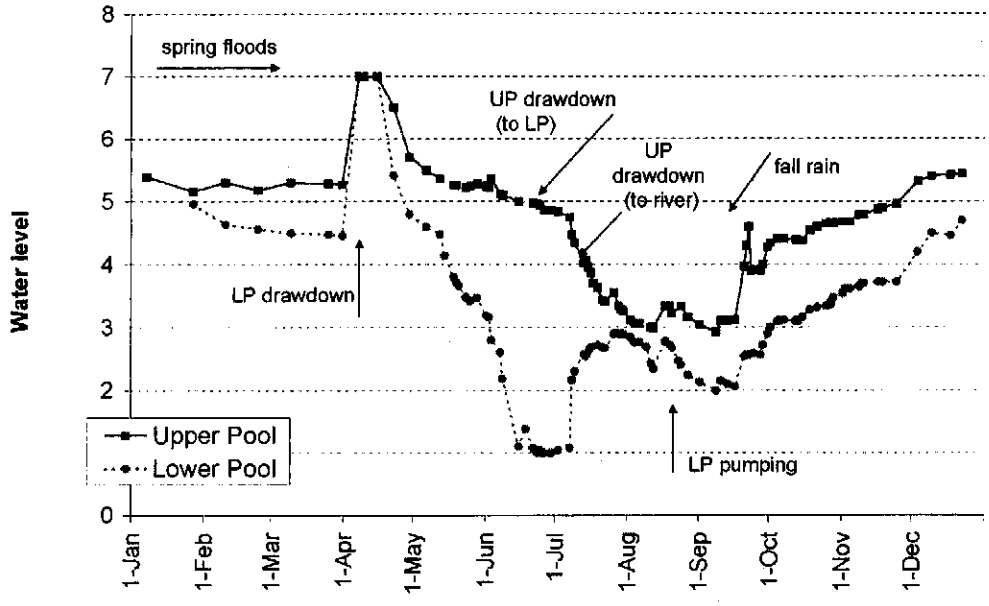
2002 Concord Impoundment Water Levels



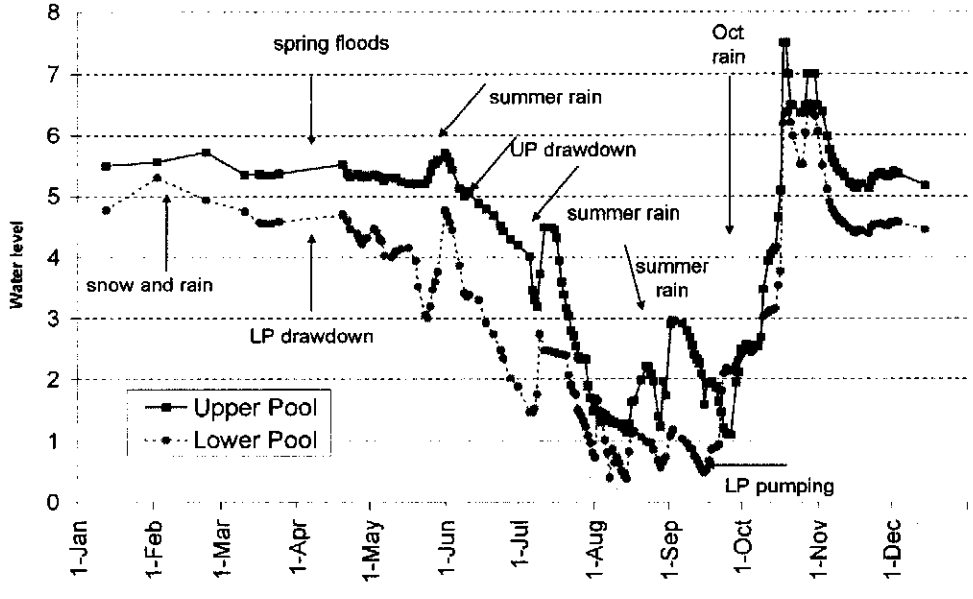
2003 Concord Impoundment Water Levels



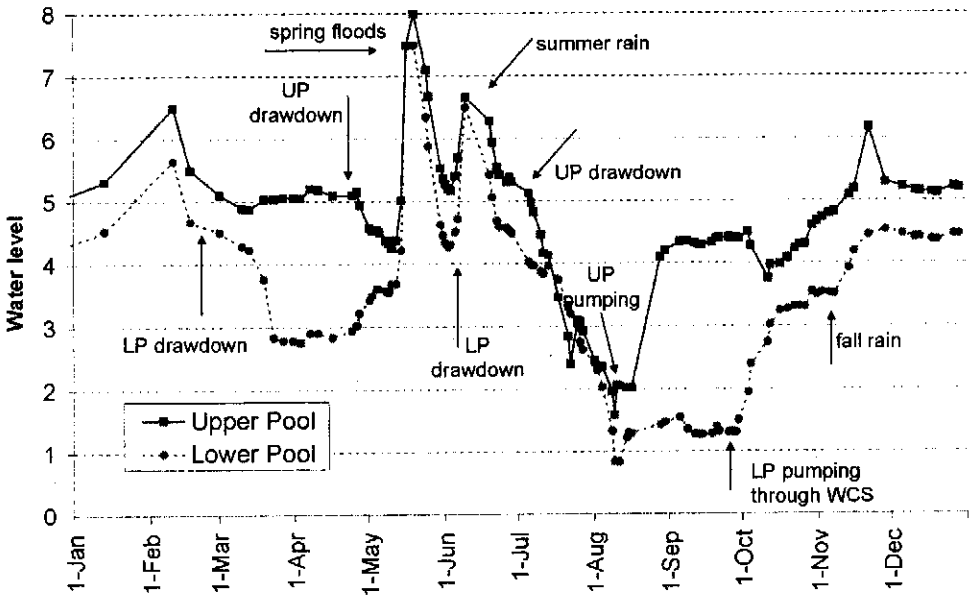
2004 Concord Impoundment Water Levels



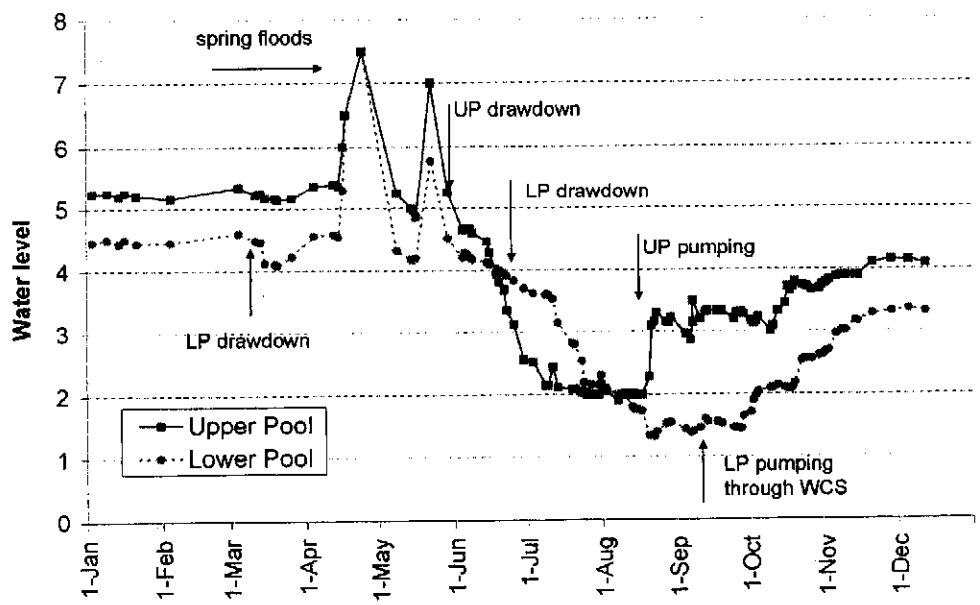
2005 Concord Impoundment Water Levels

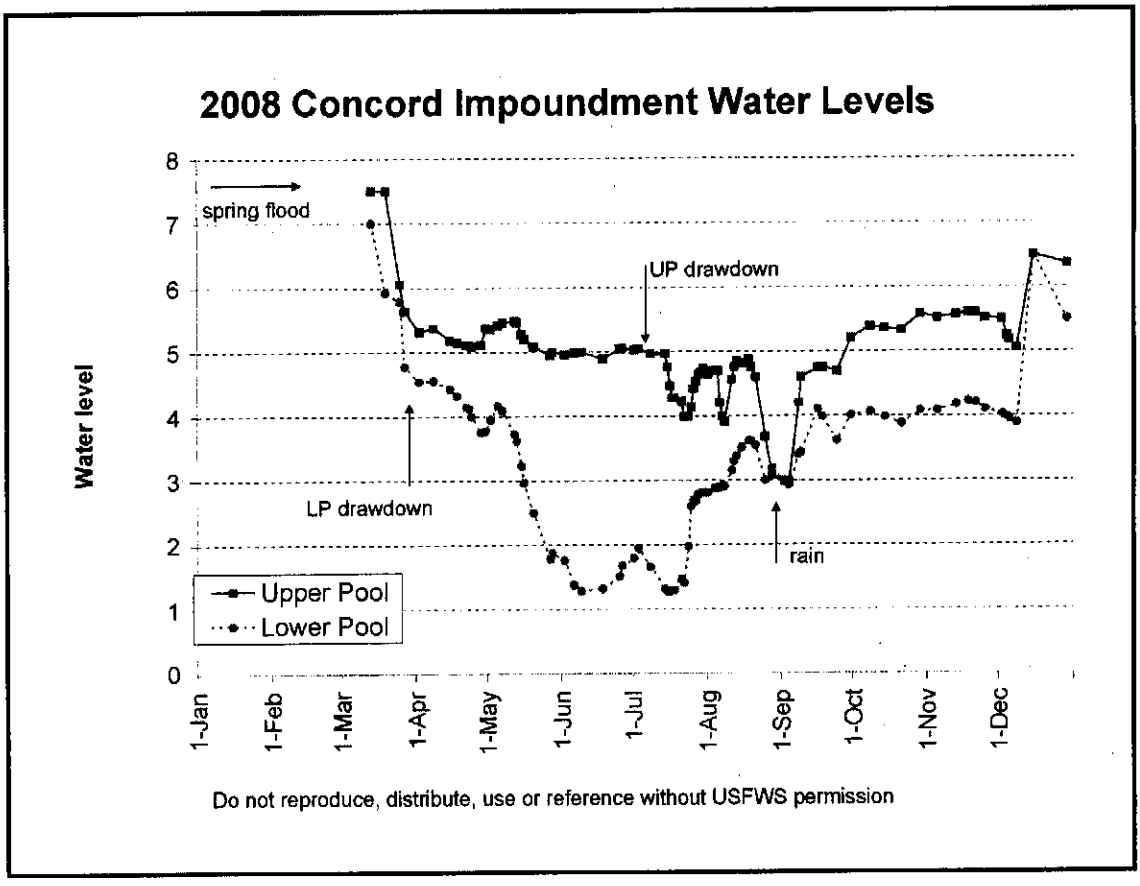


2006 Concord Impoundment Water Levels



2007 Concord Impoundment Water Levels




2008 Concord Impoundment Water Levels
Water level
8
7
6
5
4
3
2
1
0
spring flood
UP drawdown
LP drawdown
rain
Upper Pool
Lower Pool
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
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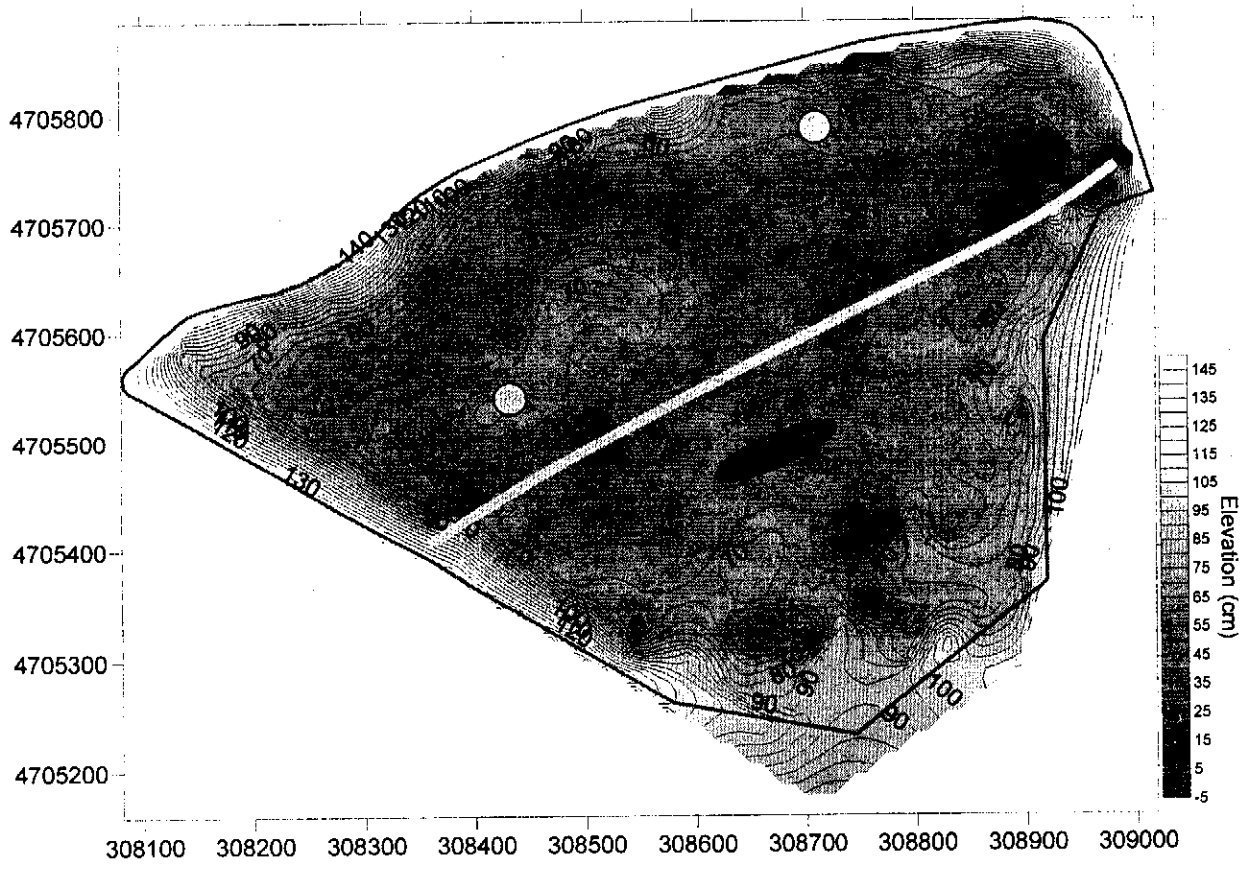
Appendix C
Bathymetry Maps and Estimated Water Levels of Concord Impoundments

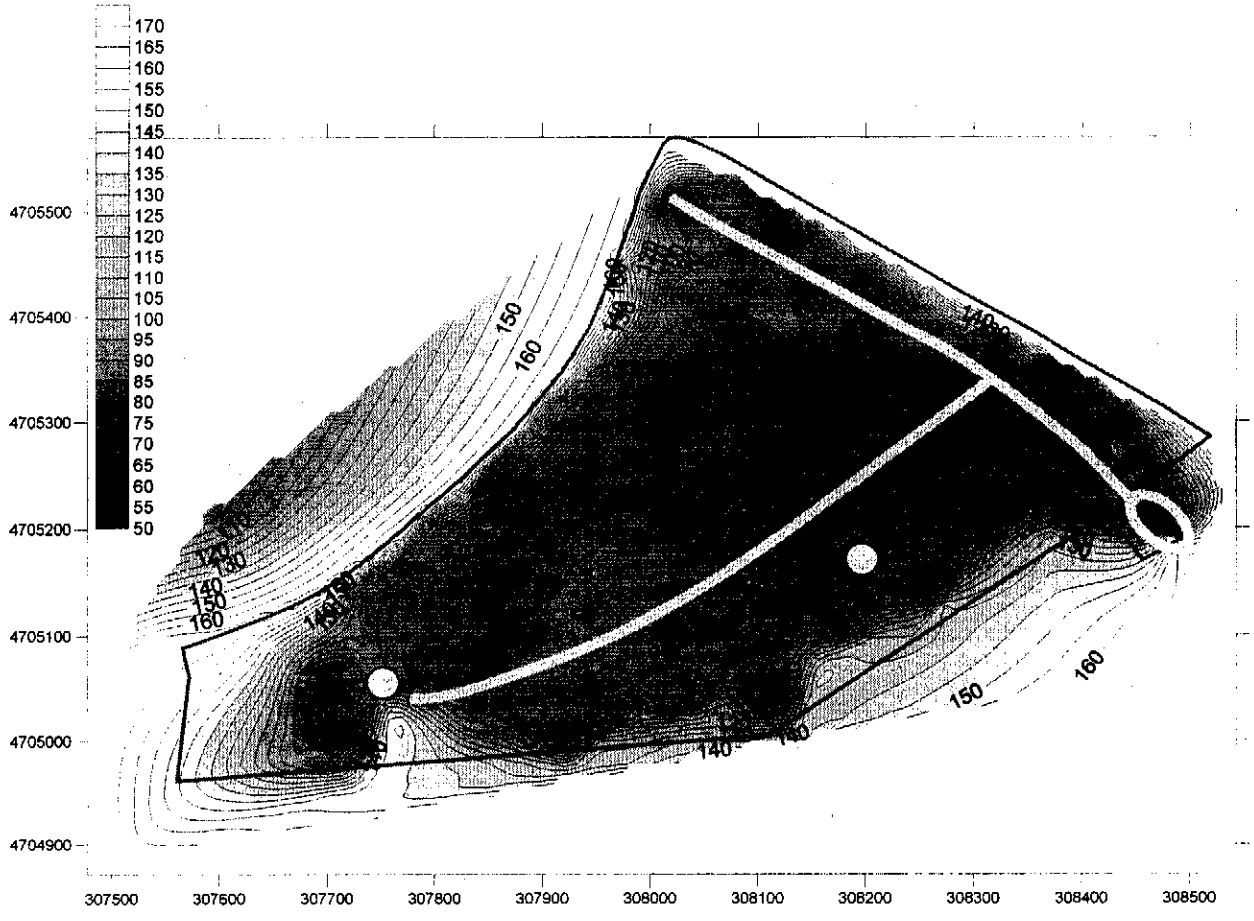
(x-axis represents easting and y-axis represents northing; yellow lines indicate approximate location of ditches; filled yellow circles indicate approximate locations of proposed refugia; hollow yellow circle indicates approximate location of current refugia; orange ovals indicate approximate location of proposed elevated areas)

Lower Pool

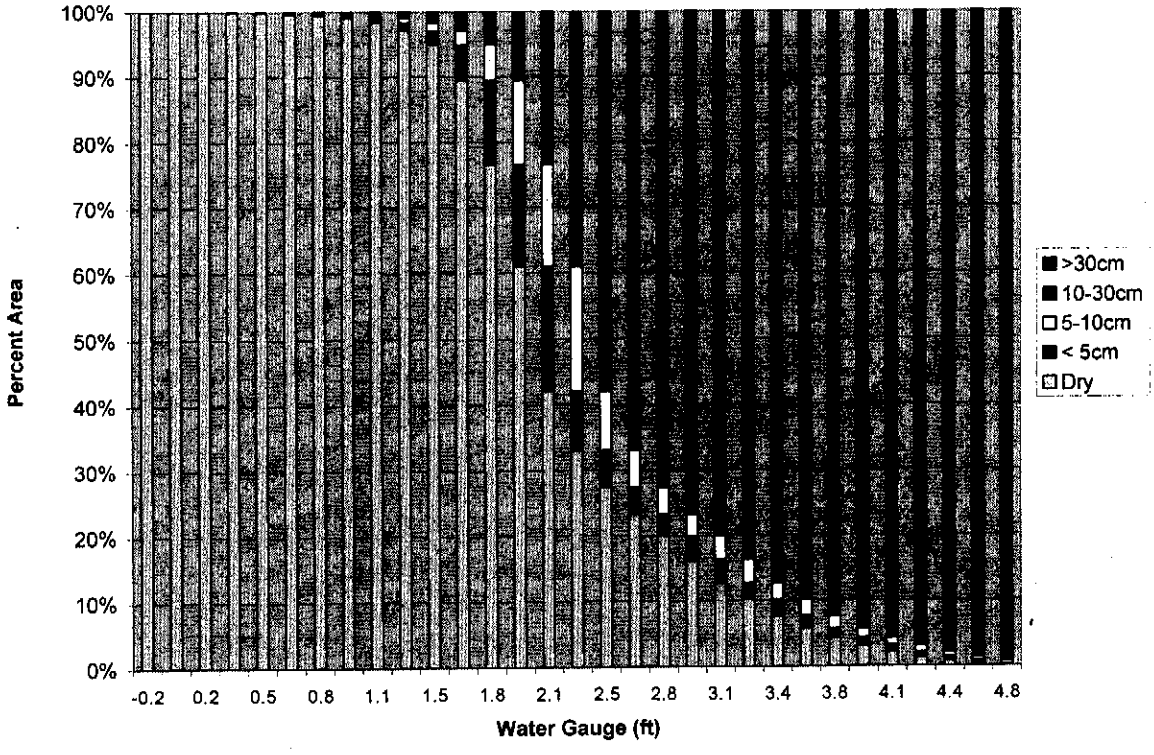


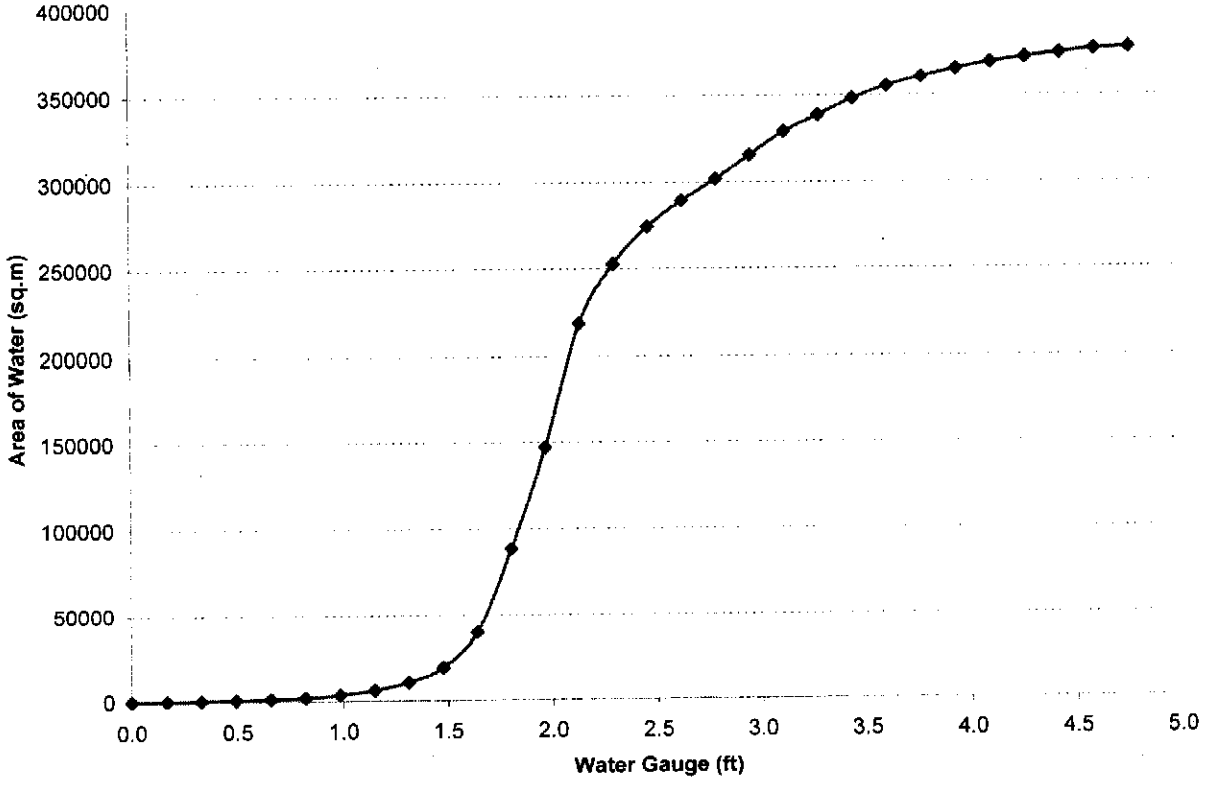
Appendix C continued
Bathymetry Maps and Estimated Water Levels of Concord Impoundments

Upper Pool

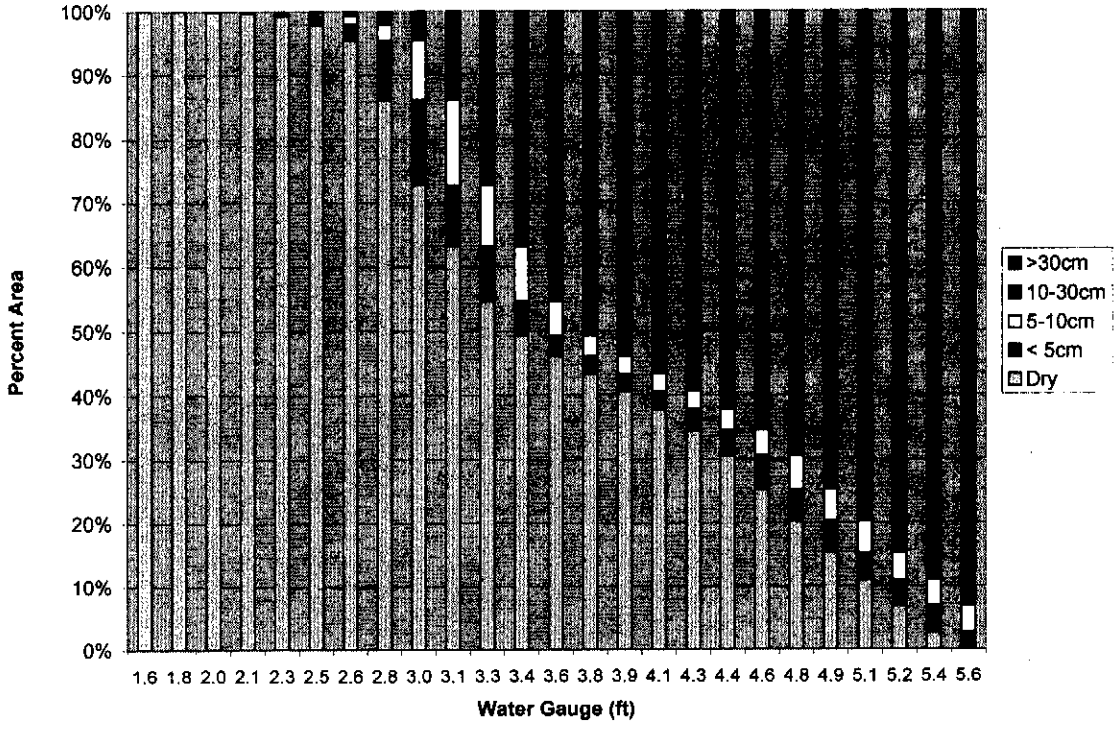


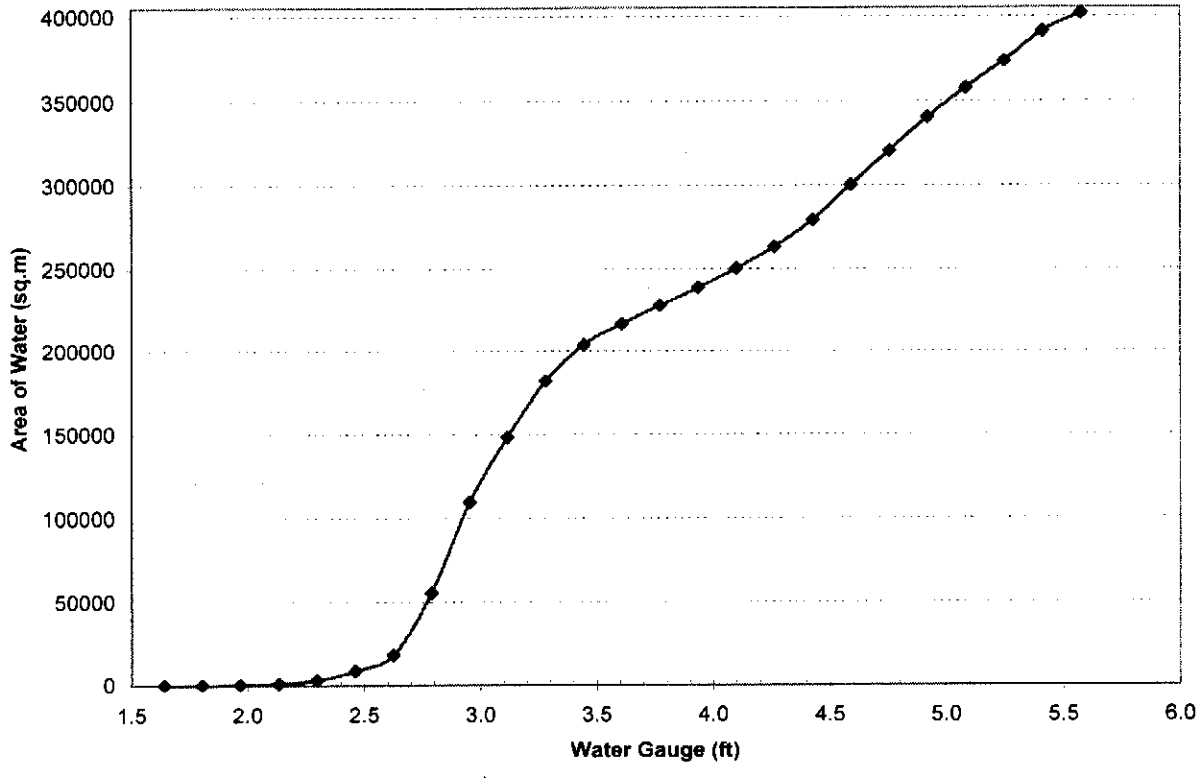
Lower Pool


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Area
-0.2 0.2 0.5 0.8 1.1 1.5 1.8 2.1 2.5 2.8 3.1 3.4 3.8 4.1 4.4 4.8
Water Gauge (ft)
>30cm
10-30cm
5-10cm
< 5cm
Dry

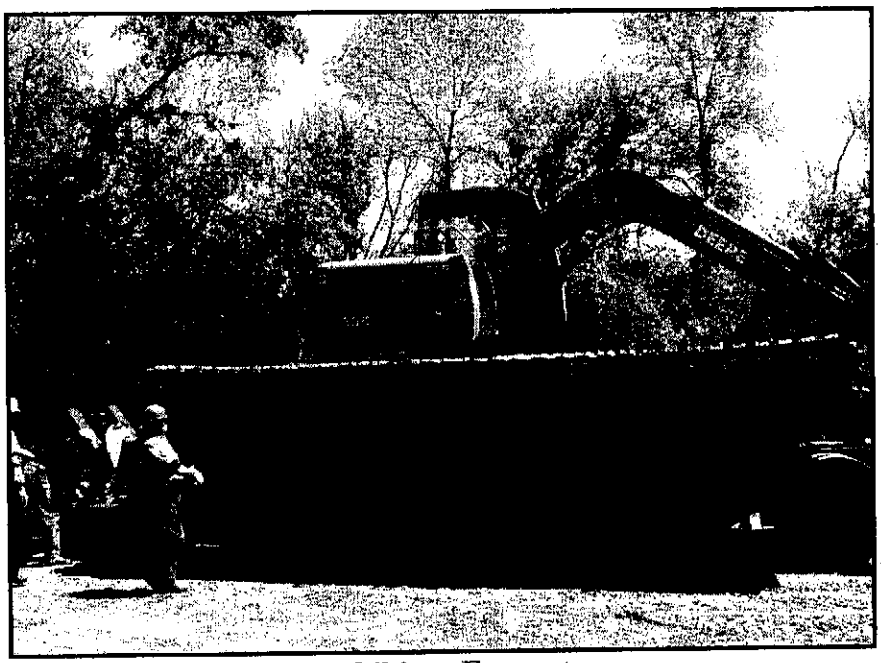

400000
350000
300000
250000
200000
150000
100000
50000
0
Area of Water (sq.m)
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
Water Gauge (ft)

Upper Pool

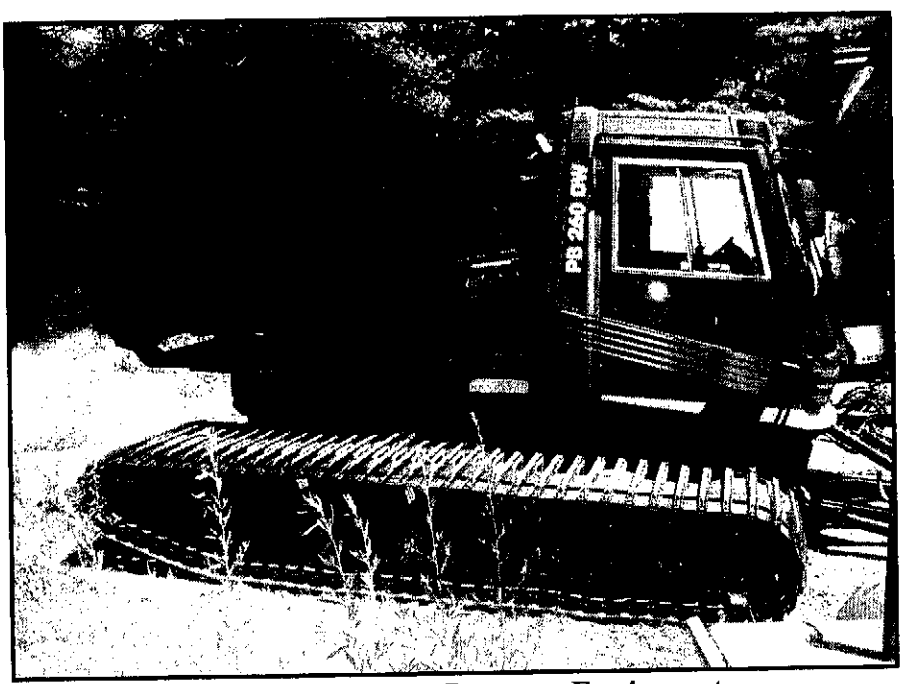

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Area
1.6 1.8 2.0 2.1 2.3 2.5 2.6 2.8 3.0 3.1 3.3 3.4 3.6 3.8 3.9 4.1 4.3 4.4 4.6 4.8 4.9 5.1 5.2 5.4 5.6
Water Gauge (ft)
>30cm
10-30cm
5-10cm
< 5cm
Dry


400000
350000
300000
250000
200000
150000
100000
50000
0
Area of Water (sq.m)
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Water Gauge (ft)

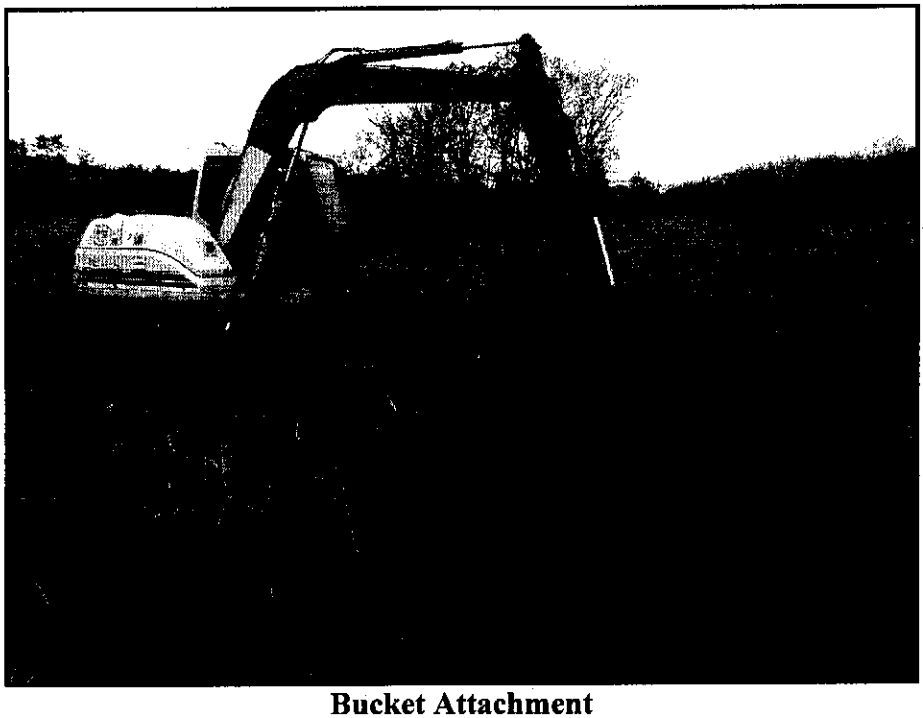
Appendix D
Equipment Proposed for Ditch Maintenance and Refugia Creation



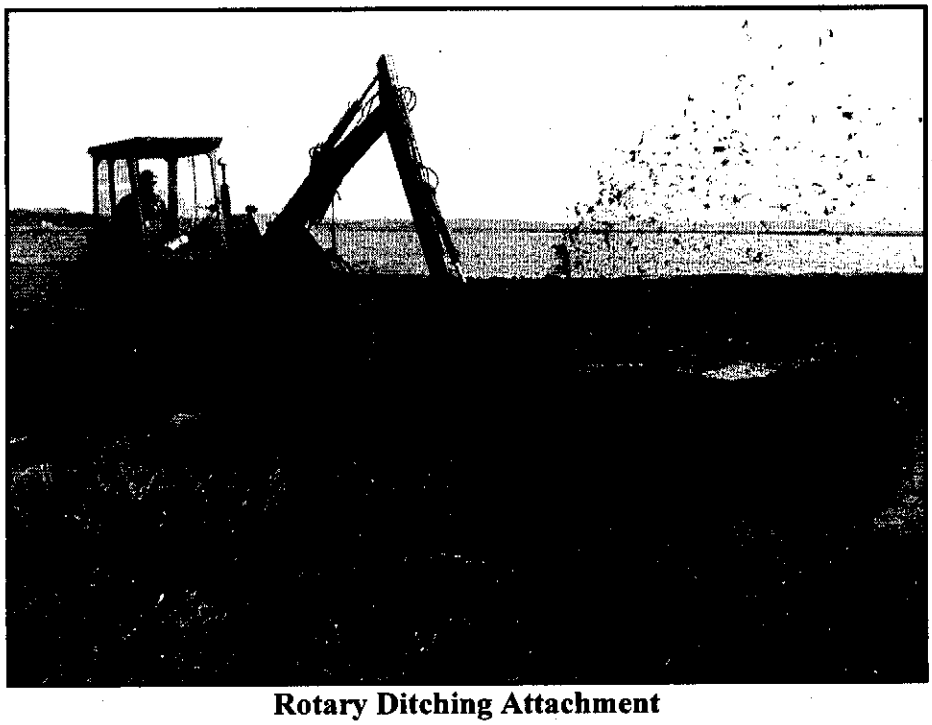
Amphibious Excavator



Ultra-low Ground Pressure Equipment



Bucket Attachment



Rotary Ditching Attachment

Appendix E
USGS Topo Map of Concord Impoundments

U.S. FISH & WILDLIFE SERVICE

Great Meadows National Wildlife Refuge, USGS Topo Map